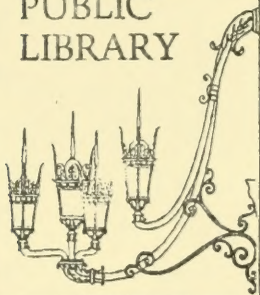


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Appendix

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R. MERTENS

FINAL ENVIRONMENTAL IMPACT REPORT

PROPOSED DEVELOPMENT

OF

BIRD ISLAND FLATS

PREPARED BY

MASSACHUSETTS PORT AUTHORITY

BOSTON/LOGAN INTERNATIONAL AIRPORT
BOSTON, MASSACHUSETTS

APRIL 30, 1981



East Boston
M 65 P
BIF
FEIR

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REVISED FINAL ENVIRONMENTAL IMPACT REPORT
PROPOSED DEVELOPMENT OF BIRD ISLAND FLATS

ABSTRACT

This document evaluates the environmental effects of the Massachusetts Port Authority's Proposed Development Plan, and alternatives, in further detail beyond that provided in the Final Environmental Impact Report (FEIR) published by Massport in December, 1980, for a 90-acre tract of filled land at the southwest corner of Logan International Airport known as Bird Island Flats, and evaluates all feasible and practical measures to mitigate environmental harm potentially connected with this development project.

Responsible
Agency:

Massachusetts Port Authority

Revised Final
EIR Prepared by:

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Notice of Availability of Revised Final EIR:

State - Expected to be in Environmental Monitor,
May 7, 1981

Comment Period on the Revised Final EIR:

State - May 7, - June 7, 1981
A-1

Comments should be submitted to:

Sam Mygatt, Director
MEPA Unit
Mass. Executive Office of
Environmental Affairs
100 Cambridge Street
Boston, Massachusetts 02202

SUMMARY OF REVISED FINAL ENVIRONMENTAL IMPACT REPORT ON
PROPOSED DEVELOPMENT OF BIRD ISLAND FLATS

INTRODUCTION

The information contained in this document is intended to supplement and clarify the explanation of the Proposed Development Plan (PDP) and its impacts, contained in Volumes I and II of the Final Environmental Impact Report, Final Environmental Impact Statement produced by the Massachusetts Port Authority and the U.S. Department of Transportation Federal Aviation Administration, dated November 28, 1980 and published in December, 1980 for review and comment. The present document also includes new information on project impacts, generated partly in response to Massport's continuing market evaluation and planning and design process for the proposed development, and partly in response to concerns expressed by the Massachusetts Executive Office of Environmental Affairs and others, during the review and comment period for the FEIR/FEIS which expired on February 20, 1980.

The Proposed Development Plan (PDP) described in the FEIR presented a generic program of uses appropriate for both the cargo and mixed use areas of BIF. This RFEIR refines these uses reflecting on-going market evaluation which has continued since the FEIR was filed. Included is an illustrative site plan which describes specific uses falling within the generic program in the FEIR. This refinement is variously described throughout this report as the "revised PDP" or "RFEIR Program".

The explanation of the proposed project, the alternatives to the project that were considered, the project environmental impacts and the measures to mitigate adverse environmental impacts from the project presented in the FEIR remain valid except as modified by new information on project impacts, potential mitigating measures and other issues presented in this report. Accordingly, for purposes of compliance with the provisions of the Massachusetts Environmental Policy Act, the Revised Final Environmental Impact Report includes the FEIR Volumes as well, and the reader should refer to the latter during review of this report.

Specific purposes of the RFEIR documents include:

1. To circulate for public review and comment additional material on the project generated in response to concerns raised by the FEIR/FEIS;

2. To publicly record Massport communications with MEPA regarding the FEIR/FEIS, and additional clarifying material on project impacts generated by Massport at the request of MEPA;

3. To provide further clarifying information on project impacts, especially traffic impacts which are substantially smaller than those reported in the FEIR/FEIS;

4. To report on additional mitigating measures beyond those reported in the FEIR/FEIS to which Massport has committed itself, including measures arising out of communications with the Federal Aviation Administration, City of Boston and others following publication of the FEIR/FEIS.

FOREWORD THE ENVIRONMENTAL PROCESS

INTRODUCTION

This Revised Final Environmental Impact Report (RFEIR) for the proposed development of Bird Island Flats (BIF) was prepared by the Massachusetts Port Authority (Massport), which is the owner and operator of Boston-Logan International Airport. This document, along with its companion documents, the RFEIR APPENDIX, and Volume I and Volume II of the Final Environmental Impact Report (FEIR) is intended to meet state EIR requirements mandated by the Massachusetts Environmental Policy Act (MEPA). This document will be referred to as the RFEIR throughout.

LEGAL REQUIREMENTS

Massport has complied with the requirements of the federal and state environmental process during and after the production of the FEIR. The present document is one additional effort to clarify the expected impacts of the proposed project action, and to suggest additional mitigating measures that may be appropriate. The RFEIR is filed in part at the suggestion of the Secretary of Environmental Affairs in a letter to Massport dated February 27, 1981, subsequent to his statement indicating that the original FEIR was inadequate under Section 62 et seq of the Massachusetts Environmental Policy Act. Following the Secretary's suggestion, the RFEIR places primary emphasis on reducing project impacts through effective and feasible mitigating measures.

DOCUMENTS

The following public documents were produced during the FEIR process, including the review and comment period following the publication of the FEIR:

- FEIR/FEIS dated November 28, 1980 (2 Volumes).
- Errata Sheet - FEIR/FEIS dated January 16, 1981

The corrections were of three types:

1. typos and syntactical changes,
 2. numerical errors that did not affect any of the results presented in the Final EIR,
 3. numerical errors that affected the results slightly, but did not affect the conclusions reached regarding the environmental impacts of the project.
- Memo to Reviewers of the FEIR from Massport dated January 26, 1981.

Enclosed were three attachments:

1. Attachment A - letter from MEPA to Massport (January 5, 1981) regarding traffic information,
2. Attachment B - Massport responses to Attachment A (January 14, 1981),
3. Attachment C - Massport letter to MEPA (January 22, 1981) setting forth the queueing assumptions used in modelling the air quality impacts of tunnel traffic in the FEIR, and also data on traffic flows in the existing tunnels.

These documents were all made available to reviewers of the FEIR by Massport, and are reproduced in the separate RFEIR APPENDIX, Appendix A-1 to A-2.

In addition to these publicly distributed documents, Massport also produced a series of technical memoranda during the FEIR review period which further explained the work presented in the FEIR and which addressed several of the technical concerns raised by MEPA, especially traffic concerns. Massport made these documents available to MEPA to assist the Secretary of Environmental Affairs in reaching a decision as to the adequacy of the FEIR. These documents included:

- Memo to Massport from Vanesse/Hangen Assoc., Inc.
re: traffic analysis BIF, dated February 13, 1981,
- Memo to Massport from Gordon Lewin re: traffic effect
of various mitigating measures for peak periods,
- Memo to Massport from Gordon Lewin re: effect of
mitigating measures on peak period traffic with
alternative assumptions.

These documents are also reproduced separately in the RFEIR APPENDIX, Appendix A-3.

PUBLIC REVIEW OF FEIR

The notice of availability of the FEIR appeared in the Environmental Monitor on December 8, 1980, commencing a 30-day public review and comment period which was extended by Massport to January 16, 1981. The time for a finding of adequacy by the Secretary of Environmental Affairs expired on January 23, 1981,

but numerous public requests were received to extend the comment period. Concerns had also been raised by the MEPA staff about the clarity of the traffic impact discussion in the FEIR and, accordingly, on January 23, 1981 Secretary Bewick and Massport mutually agreed to an extension of the public comment period to February 13, 1981, thus anticipating the Secretary's statement on the adequacy of the FEIR by February 20, 1981.

During the ensuing weeks Massport performed the additional technical analyses referenced above. Meetings with MEPA were held on February 9, 1981 and February 18, 1981 to identify the specific technical concerns of that agency regarding the FEIR. Massport undertook to provide the clarifying information requested by the Secretary's office to assist the Secretary in forming his view on the FEIR's adequacy. During this same period, letters of concern were received by Massport from the City of Boston. The City requested additional mitigating measures for adverse impacts, including, among other things, the early construction of an active transition zone with mixed use commercial development, and modifications in the proposed main air cargo building alignment. Additional measures were agreed to by Massport and the City, and MEPA were notified to that effect.

On February 20, 1981, the Secretary of Environmental Affairs declared that the FEIR did not adequately comply with Massachusetts General Laws, Chapter 30, Section 62-62H, and the regulations implementing MEPA. In response, Massport, in a letter dated February 23, 1981, stated that the FEIR was indeed

adequate, and declared its intention to re-submit the BIF project for further review.

Copies of the project correspondence mentioned above can be found in the RFEIR APPENDIX, Appendix A-4.

CHAPTER 1 - PURPOSE AND NEED OF PROPOSED ACTION

In this Chapter of the Revised Final Environmental Impact Report, Massport's Proposed Development Plan is reviewed once again, including the basic policy objectives and criteria applied in conceiving and planning for the project (Section 1.1.), the definition of the Proposed Development Plan (PDP) as described for purposes of this further review (1.2.), specific needs met by the proposed project and its expected benefits (1.3.) and implementation timetable (1.4.). This discussion will also consider various comments relevant to the above issues which were offered by reviewers of the Final Environmental Impact Report published in December, 1980.

1.1. Basic Project Policies, Objectives and Criteria

Massport proposes to convert the approximately 90 acre Bird Island Flats landfill area, currently vacant of development, into a high quality, well-designed and integrated cargo and mixed use development complex. The proposed land uses for BIF and basic building alignments and designs were derived from a lengthy planning process which is described in the FEIR, Chapter 2, Section 2.1. Massport's view is that the proposed project must meet several fundamental policy and operational criteria which have collectively constituted the underlying rationale for the

proposed project from its inception. The following summary clarifies these criteria.

1.1.1. Institutional Mandate

The basic mandate to the Massachusetts Port Authority under its enabling legislation is to promote sound regional economic development, in a manner which is "in all respects for the benefit of the people of the commonwealth, for the increase of their commerce and prosperity, and for the improvement of their health and living conditions." (Enabling Act, Section 17). In the implementation of this mandate through operation of the Authority's basic facilities (Logan/Hanscom Airports; Boston Seaport; Tobin Memorial Bridge), Massport must act to remain competitive and viable as a long term transportation/commercial center serving the New England area. In order to do so, it is an essential institutional requirement that the Authority operate its facilities in reasonable harmony with its surroundings, including the community impacted by its operations and especially the City of Boston in which Massport's facilities are for the most part located. This requirement emerges both from the Enabling Act and from the Massachusetts Environmental Policy Act, the provisions of which have supplemented and become an integral part of Massport's institutional charter.

A companion institutional consideration is that the Authority should administer Logan Airport in a manner which complements the

efficient utilization of its other facilities at the Boston Seaport and on the Tobin Bridge. As will be seen in later sections of this report, this objective translates into several specific needs and actions (e.g., operating Logan Airport's facilities in a manner which maximizes the utility of the Mystic Bridge to provide access to Logan as well as to Boston's core). A fundamental need under this heading is to promote the utilization of Bird Island Flats development, especially in the context of BIF's unique location in the inner Harbor, to complement Massport's other improvement programs at the Seaport, at Commonwealth Pier (directly across the inner harbor from BIF) and at other harbor locations. These programs potentially involve complementary goods/cargo handling strategies and related, mixed use development which collectively should promote both the economic health of the Boston region in general, and the reemergence of Boston Harbor as a major economic center in particular.

1.1.2. Financial Requirements

Another set of concerns which is central to Massport's institutional charter involves economic and fiscal requirements which Massport must honor. A basic requirement is that the Authority operate its facilities in a manner which generates sufficient revenues to meet its trust obligations and to avoid imposing demands or burdens on the Commonwealth's state and local tax structure. It is widely known that this source of public finance is under severe pressure in Massachusetts, partly as a

result of recently-adopted limitations on resort to the property tax -- the traditional source of funds for Massachusetts localities, including the City of Boston -- and also because of nationwide inflationary trends and cutbacks in federal fiscal assistance. Massport's obligation to find and rely on non-tax revenue sources has thus become all the more important in recent years in order to underwrite Massport's continuing contribution to the region's economic and transportation infrastructure.

It has therefore been a major requirement for development of Bird Island Flats that Massport utilize one of its remaining developable land resources to diversify the sources of income to the Authority and to exploit as fully as possible the unique characteristics of the BIF site as one of the Boston's area's only remaining, Inner Harbor, developable land areas. This requirement is also connected to Massport's policy of applying a full cost recovery approach to financing the total costs of the operations of Logan International Airport. A primary revenue source for Logan's operation is the landing fee paid by air carriers and operators seeking to use the Logan airfield. This revenue source, along with others, including rental income from leased property and facilities, parking charges, concession and other income, comprise collectively the income stream which must cover total Logan expenses as well as sufficient reserves to meet Massport's trust obligations. Bird Island Flats represents both another potential income source and another cost center. Income from BIF activities as a whole must therefore cover the land and other costs reasonably allocated to BIF, and, in addition, such

other costs of Logan's operation as Massport may determine reasonably to absorb, such as a reasonable portion of general administrative, maintenance and operating expenses, as well as charges for services for shuttle bus, taxi cab services, public information services, and other services to the general public by Massport's licensees or concessionaires under Massport's agreements with them. From this point of view, it is important that Massport evaluate the broadest possible range of aviation-related land uses and activities at BIF in order to provide a substantial and flexible income stream. This has become even more important in recent months as the loss of federal funds under the Airport Development Aid Program, which all major airports have relied on for significant contributions to capital improvements budgets, becomes more likely in the face of federal program cutbacks.

Moreover, within the BIF cost center itself, it will likely be necessary for certain uses of BIF land to provide income which will absorb at least in part costs of BIF development for cargo activities which would otherwise be required to pay the full cost of development on BIF's filled land site. These uses are judged to be a high priority activity for location directly on airport. (The question of land use policies and priorities is reviewed in the next section of this Chapter.) Finally, in ascertaining the appropriate level of income which the BIF development must generate, Massport must act in the context of overall policy which is to set all user charges, including the landing fee, lease income, and so forth, at reasonable levels consistent with

improved airport management and cost consciousness, yet commensurate with overall airport costs and the various legal and other obligations which Massport, as a public institution, must fulfill under its governing legislation.

1.1.3. Land-use Criteria

Logan Airport's prominence in contributing to the region's economy and transportation system have brought with it a host of demands for aviation related development on land on or near the airport. Among the uses for which space demands are being made and which are potentially accommodated on Bird Island Flats are the following:

- Cargo/freight handling activities: There is substantial demand for space at Logan Airport for cargo facilities which require immediate access to aircraft apron areas ("airside" access). There is demand, as well, for freight handling activities which may function without such apron access; these activities require reasonably direct ground access to the airport ("landside" access) but may locate and, indeed, in many instances are locating already in East Boston, Chelsea and Revere.
- Aviation-related mixed uses: There is an equally substantial demand, which Massport expects will intensify over time, for location on or very close to Logan by activities which are aviation-connected or airport-supporting, including airport office

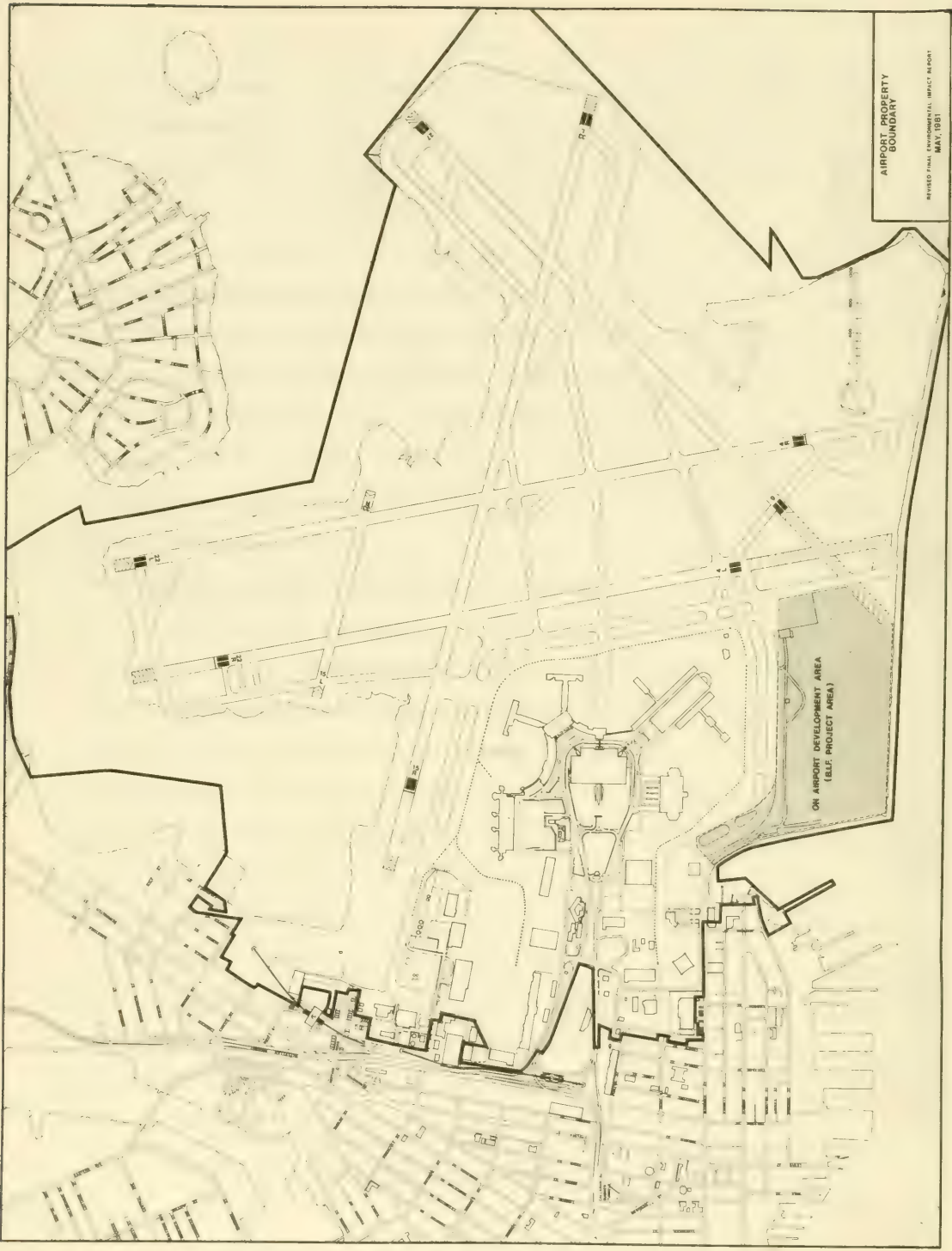
space, conference and hotel facilities, light manufacturing or assembly facilities, airport-related housing (e.g. flight crew quarters) and similar forms of commercial development.

Massport's basic responsibility in evaluating this broad range of demands is to use its powers and resources to guide and direct growth in aviation-related development to locations which are appropriate operationally, which minimize adverse impacts, and which promote maximum compatibility with surrounding areas.

Another dimension of the land-use policy issue is that the Authority has adopted a policy which forecloses airport expansion or land acquisition outside of current boundaries. This policy commitment, embodied in the Logan Airport Master Plan Policy Statement ("Master Plan") -^{*/}, is predicated in part on an affirmative provision of law which restricts the Port Authority's eminent domain powers in connection with land-takings for airport development in East Boston. It is also an outgrowth of certain historical events which are outlined in Chapter 3 of this Report.

Focusing on the opportunity presented by Bird Island Flats, the Flats area is designated in the Master Plan as the prime, remaining developable area within Logan's boundary, as shown on Figure 1. As one can see, this site, which is filled land in Boston Harbor, constitutes an extremely scarce and valuable land area which must be carefully and systematically utilized to meet the policy and operational objectives outlined here in Chapter 1,

^{*/} Master Plan, Logan International Airport, Massachusetts Port Authority, April, 1976.



AIRPORT PROPERTY
BOUNDARY

REVISED FINAL ENVIRONMENTAL IMPACT REPORT
MAY, 1981

FIGURE 1

and which are fundamental to Logan's continued viability. Obviously, to insure that these objectives are met, Massport must closely scrutinize activities which may seek to locate on airport property and must set land-use priorities which best meet all of these basic criteria. In its examination of the categories of land-use, and upon consideration of alternative on-airport sites which may become available as leases expire (in particular, the North Apron area), Massport has made the following judgements:

o Cargo and related activities: Highest priority for BIF location is assigned to those cargo operations, mainly by air carriers, which require direct airside access in order to serve their intended functions and to operate at a reasonable profit. This activity will be accommodated to the maximum degree on BIF consistent with Massport's assessment of current and future demand for this kind of cargo handling facility (See Section 1.1.4 of this Report) and consistent as well with Massport's evaluation of the need to provide space for equally high priority activities within the mixed use category of aviation-related activities also potentially accommodated on BIF. Lower priority is assigned to freight forwarder operations which need reasonable landside access to Logan but which do not require apron access; and to other airline or airfield support activities such as food preparation establishments, fuel storage areas, and general aviation facilities. Massport will provide space for these activities on BIF only to the extent consistent with the accommodation of higher priority uses and with the need to meet the overall policy and operational standards described in this

Section. With respect to GA facilities, the Final Environmental Impact Report makes note of the fact that Massport is committed to relocation of the GA facility currently located in an operationally inefficient and environmentally inappropriate portion of the Southwest Service Area. Massport will determine in the future the extent to which such activity will be relocated to BIF or elsewhere on Logan Airport.

o Mixed-use activities: As in the cargo category, there are differing priorities within this set of potential aviation-related uses of BIF. Among these uses is a computer and information marketing center which has been suggested to Massport by its developer advisor. The characteristics of this center are described at Section 1.2.2 of this Chapter. The marketing analysis conducted to date indicates that the facility requires direct access to Logan Airport in order to operate must successfully in the Boston area. That analysis also suggests that if a site with the characteristics of BIF is not provided, there is a substantial likelihood that the center will locate elsewhere in the United States, at a site having characteristics similar to those of BIF.

In addition to the unique features offered by BIF for such a center, the economic return to the Boston region as well as the financial return to Massport from a computer information center on BIF promises to be the highest of any of the aviation-related cargo or mixed uses presently under consideration for location on BIF. Also, this center, as will be discussed in more detail in this Section of Chapter 1, enjoys environmental characteristics

which are assessed to be very beneficial, both in terms of minimizing prospective impacts otherwise associated with automobile traffic to and from the center, and in terms of offering an economically viable architectural opportunity to create a positive noise and visual buffer and land-use transition zone between Logan's airfield and aircraft activities and the East Boston residential community, Boston Harbor, and downtown areas located near BIF. Massport has therefore assigned high priority to location of this type of land use on BIF.

Other high priority activities include airport office space for tenants who are seeking direct airport access and who, for the most part, have airport-connected businesses, as well as airport-dependent hotel development. Unlike the computer information center, however, these activities -- including hotel development, which, however, Massport is not presently recommending for inclusion in its BIF Proposed Development Plan -- will likely locate off but near Logan Airport if an on-airport site at BIF is not provided. Should such aviation-related development take place off-airport, there is a substantial likelihood that adverse land-use, environmental and other impacts would occur, especially if existing pressures towards development of office sites in East Boston residential sections continue to intensify. Massport has thus given at least certain of these uses high priority for development on Bird Island Flats. Similarly, the proposed conference facilities of the kind described in Section 1.2.2 of this Chapter of the RFEIR are very airport-dependent. Should these activities be forced to locate

off-airport, prospective operators will doubtlessly search for nearby sites in East Boston or elsewhere in the regional core, possibly at highly inappropriate locations with traffic and other adverse impacts extending beyond those which Massport has sought to control through its development approach.

1.1.4. Demand For Cargo Facilities at Logan Airport

Logan International Airport is the major airport for New England as well as the Boston area. As such, it must accommodate a substantial portion of the reasonably projected demand for cargo handling in the Boston and New England region to permit Logan to remain a competitive and viable airport, and to serve the region's economic infrastructure requirements which are heavily dependent on goods movement. Because this demand for cargo handling requires that cargo facilities interface with major air passenger carriers, the need for improvements at Logan will exist even if other airports in Massachusetts eventually implement improved cargo facilities.

During our review of the comments received on the Final Environmental Impact Report, two issues relating to the question of demand for cargo facilities were frequently raised. One was whether Massport's estimates of projected demand (in cargo tonnage to be processed) and the extent of building areas and apron space needed to handle the projected demand were reasonable. The second was whether Massport considered the possibility that some of the projected tonnage demand could be better handled elsewhere in Massachusetts (e.g., in Worcester). Each of these questions is reviewed in detail here.

1.1.4.1. Air Cargo Demand Estimates

In the Final Environmental Impact Report, Massport reported its projection of year 2000 demand for cargo handling at some 473,000 tons per year (see FEIR, Chapter 1 at p. 1-2). Some residents of the East Boston community contested this estimate and expressed their concern that cargo building areas and apron space assigned on BIF are, together with other such areas on Logan, far in excess of space which would be required under a reasonable estimate of projected demand. On the other hand, the Secretary of Environmental Affairs expressed a strong preference that the on-airport land area at BIF should be reserved exclusively for cargo handling or related aircraft or airfield uses. Both of these points of view may reflect certain misunderstandings regarding Massport's analysis of forecasted demand and resulting needs for building areas and apron space. Three specific questions arise in this connection: (1) which long-term growth projections for cargo processing were used by Massport and what was their basis; (2) what is the relationship of cargo tonnage projected to the amount of building area necessary to process that tonnage; and (3) what is the relationship between projected cargo tonnage and the aircraft operations and associated apron parking positions necessary to provide reasonable cargo lift capacity. These questions are examined below.

In the FEIR, Section 1.3.1., Massport described its "baseline forecast" of tons of cargo to be processed in Year 2000 based in part on an analysis performed in 1979 by Massport's consultant,

Charles River Associates (CRA). The CRA baseline forecast is lower than comparable industry forecasts for Boston produced either by the Federal Aviation Administration or by the Air Transport Association. Figure 2 shows various forecasts for the domestic cargo portion of Logan's total demand. The range associated with the CRA baseline forecast represent CRA's estimate of domestic cargo demand under high and low growth economic assumptions. The average annual growth rate implied by the CRA baseline forecast for domestic cargo is 4.1% per annum, compared with 6.7% and 8.2% for the two FAA forecasts also depicted in Figure 2.

Figure 2 shows only the domestic cargo portion of the demand. The addition of international freight brings the total cargo projection for year 2000 to the 473,000 tons shown on Table 1.3.1 in the FEIR at p.1-3, and used to estimate building area requirements.

The basic question with respect to the air cargo volume projections is whether Massport has adopted a reasonable forecast as the basis for its planning. This question can only be answered by recognizing first, that, as in other aspects of the analysis of demand for cargo facilities, we are dealing in an area of substantial uncertainty regarding forecasts for cargo growth. Massport, for example, has seen strong evidence that FAA and industry forecasts, traditional sources of estimates for airport cargo improvement programs, have historically been optimistic and have failed to accurately portray actual growth experience. The reasons for this may be that methods used in

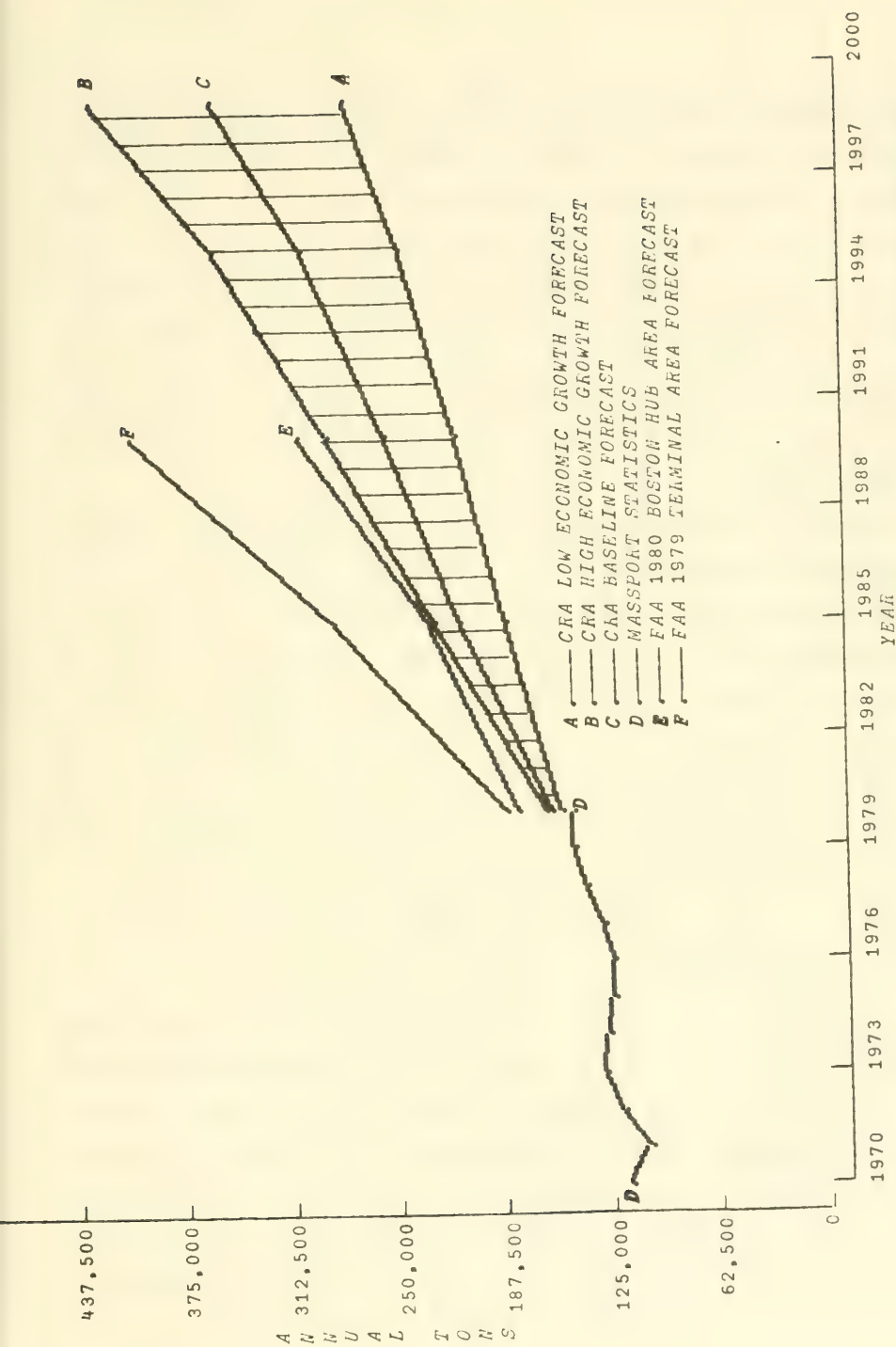


FIGURE 2

these forecasts have combined trend analysis techniques (which generally overstate the effect of high growth rates during the industry's early years upon future year demand), with techniques which allocate Boston's historic share of national demand projections. Boston shows an upward bias in the latter forecasts because of the relatively lower industrial growth being experienced here as opposed to other, less mature regions of the country, but this bias is not accounted for in allocating national shares.

By way of contrast, the CRA approach employed a regional econometric modelling technique using actual economic performance of the Boston area. This approach should minimize tendencies to overpredict growth. At the same time, Massport, it should be noted, has chosen not to select CRA's low economic growth forecast in contrast with the baseline forecast which was utilized, as described above. Massport believes it would be imprudent to base its long range planning on the unusually low economic assumptions underlying the CRA low range forecast in view of the good performance of Massachusetts high technology based economy during the current recession.

A key point to observe is that the purpose of the cargo volume forecasts and the building and apron requirements which are derived from them is only to establish the likely, outside long-term physical need for cargo facilities. Massport has used this analysis to develop a plan for BIF which is capable of providing facilities to meet those needs and to analyze the environmental impact of this plan. Given the recognized

uncertainties of this type of analysis, Massport will construct only those facilities for which an actual demand materializes in the future.

Building Area Requirements

The building area required to process the projected cargo demand is estimated by applying a building efficiency of 1.2 square feet per annual ton of cargo processed to the baseline cargo forecast for the year 2000. It should be noted that this calculation excludes mail, which is consolidated at the central postal facility rather than at air cargo facilities. Moreover, this calculation results in an estimated requirement for cargo carrier space only, and excludes area which may be provided for freight forwarders, since almost all freight processed by forwarders is reprocessed later by a carrier. Table 1.1.4.1 illustrates the relationship of existing and future building areas devoted to processing air carriers cargo:

Table 1.1.4.1
(square footage)

	<u>Existing</u>	<u>Future</u> (year 2000)
North Apron	258,000	195,000
Southwest Cargo Area	38,000	38,000
BIF Cargo I	---	285,000
BIF Cargo II		<u>106,000</u>
Total	296,000 sq. ft.	624,000 sq. ft.

In its evaluation of future building space needed to process air cargo, Massport has recognized that several areas are subject to uncertainty. For example, in estimating the reduction in North Apron building area from the existing 258,000 sq. ft. to the future 195,000 sq. ft. (see FEIR, Chapter 1, at p. 1-5), it is assumed that only the existing American Airlines cargo building (63,000 sq. ft.) would be removed from cargo service due to its undesirable location on the last remaining section of terminal roadway. It is possible that a reorganization of North cargo apron area might result in still further removals of cargo building area from service, thus increasing pressure on accommodation of forecast demand at BIF.

Similarly, the estimate of building area available for cargo processing on BIF is subject to some uncertainty. The existing North Apron buildings represent actual measured building areas, whereas all BIF areas are expressed as building envelopes. During actual design of individual tenants' facilities, the square footage actually available for cargo processing may drop somewhat as building envelope areas are reduced to provide individual building clearances, fire vehicle access, apron access corridors, setbacks, etc.

One final consideration affecting the area of cargo buildings on BIF is the assumption that all of the stated areas will be utilized by air carriers. In fact, that portion of the Air Cargo I building area (see Illustrative Site Plan, Figure 3, and Section 1.2.1) which has been reoriented to a north-south alignment (approxiamtely 67,500 sq. ft.) could be used for

freight forwarding space. In that case, this area should not be included in the building efficiency calculations, since its cargo would ultimately be re-processed at a carrier's facility. Subject to these uncertainties regarding the ultimate area devoted to cargo processing in future years, it is Massport's view that the assumption of 624,000 sq. ft. of area for 473,000 annual tons is reasonable.

Cargo Aircraft Apron Positions

The final task in estimating overall cargo facility requirements for Bird Island Flats is to translate the total annual demand for cargo and mail into likely requirements for aircraft apron parking spaces. This task is complicated by variations or uncertainties in many of the factors affecting overall cargo lift capability such as: aircraft load restrictions and load factors; uncertainty in the future distribution of cargo between passenger aircraft lower holds and all-cargo freighters; the efficiency with which apron positions are likely to be utilized; the peaking characteristics of freighter operations to certain destinations; variations in the ratio of enplaned to deplaned cargo; and other similar factors. When all of these factors are combined, a substantial variation in estimates of needed apron parking positions can result. The individual factors affecting these estimates are outlined below:

Enplaned/Deplaned Ratio: All the tonnage estimates used in estimating cargo demand have been given as the total of both enplaned and deplaned tonnage. In fact, the amount of enplaned

(outbound) and deplaned (inbound) cargo at Boston is not equal. In 1979, for example, about 60% of the total tonnage shipped was enplaned cargo, reflecting Boston's position as a net exporter of goods. Regardless whether the ratio of enplaned to deplaned cargo on any given day favors the inbound or the outbound demand, it is clear that the total demand for one-way cargo lift capacity could be greater than 50% of the total volume shipped on that day. Massport estimates the range of variation of this factor to be from 50% (if the inbound is exactly balanced by the outbound) to 60% (the current, annual average imbalance).

Freighter v. Belly-Cargo Share: The range of variation of this factor is somewhere between the current value (40% of total cargo tonnage is shipped in all cargo freighters) and the lowest probable value being forecast for the future (22% of total cargo tonnage being shipped in freighters).-*/

Frequency and Peak Demand: Depending on the size of individual markets, freighter flights do not operate every day of the week. The most frequent freighter service being offered is currently 6 times a week, while several markets are served as little as once a week. If several low frequency markets are served on the same days, the peak demand for apron positions is increased. To account for possible variations in this frequency (or peaking) factor, we used a maximum value of 5 flights per week (260 annual flights) to a minimum value of 2 flights per week (104 annual flights).

-*/ Federal Aviation Administration, Aviation Forecast (Boston area), March, 1980.

Load Factor: Variations in the load factor (the ratio of cargo actually carried to the capacity of an aircraft) will affect the number of flights necessary to carry a given tonnage of cargo. It is obviously desirable for reasons of economy as well as energy efficiency to maintain load factors at the highest possible level; nonetheless, several factors prevent this from happening in practice. First, the weight to volume ratio of the cargo being shipped usually results in an aircraft's volume being filled before its weight capacity is reached. For example, Flying Tigers reports that the cargo volume of their Boston 747 is completely filled at about 70% of its weight based capacity. A second limitation on achieving maximum load factor is the economically efficient practice of combining flights from two nearby cities, neither of which would fill the airplane alone, in one long distance flight at a reasonably high load factor. The average load factor on Boston to New York to Los Angeles flights in 1980 was only 43% on the Boston to New York leg. Another example of this practice is Air France's Boston-New York-Paris freighter which departs Boston for New York at an average load factor of 35%. In our estimates we used a range for this factor of 35% to 70%.

Average Aircraft Capacity: The greatest efficiency of apron utilization would obviously occur if all cargo were transported in the largest available aircraft (747's with a capacity of about

100 tons). However, because all markets are not sized for this maximum capacity aircraft, many flights will utilize smaller aircraft such as DC8's at 43 tons, 707's at 35 tons, 727's at 22 tons, or DC9's at 16 tons. Although we expect increased use of 747 freighters in the future, a reasonable minimum average capacity might be as low as 60 tons considering a mix of aircraft types. Massport assumed range of capacity between 60 and 100 tons per flight.

Apron Efficiency: This factor attempts to state the apron efficiency in terms of the number of aircraft operations per day on each aircraft apron parking position. Freighters usually arrive in the mid to late morning and lay over until their evening or nighttime departure, resulting in an apron efficiency at 1.0 operation per day. However, under congested conditions such as exist on the North Cargo Apron, we have experienced apron efficiencies of about 1.5 operations per day, representing a reasonable maximum for apron efficiency. Massport employed a range of apron efficiency of between 1.0 and 1.5 operations per day.

Although it is extremely unlikely that all of these factors affecting the efficiency of freighter operations and, hence, the number of apron positions required, will occur in either the most efficient or the least efficient combination, it is illustrative to indicate the change in the number of apron positions required to meet projected demand under those extreme conditions.

Table 1.1.4.2

Variations in Apron Positions

Projected Demand = 536,000 tons/yr. (including mail)

Factor	Range	Largest Apron Requirement	Smallest Apron Requirement
Enplaned %	60% - 50%	321,600 tons/yr.	268,000 tons/yr.
Freighter Share	40% - 22%	128,640 tons/yr.	59,960 tons/yr.
Load Factor	35% - 70%	367,543 tons/yr.	84,229 tons/yr.
Frequency	2-5 flts/wk.	3,534 tons/day	324 tons/day
Average Capacity	60-100 tons	59 flts/day	3.2 flts/day
Apron Efficiency	1.0-1.5 flts/day	59 apron positions	2.2 apron positions

Despite the broad range presented by this analysis, it is useful as a backdrop against which to evaluate the estimates of flight activity used in the Draft and Final EIR, the requests by likely tenants for apron space at BIF, and the apron area being proposed in the RFEIR.

Flight Transportation Associates, Inc., a consultant to Massport, prepared an estimate of future cargo aircraft flight operations at Logan which was utilized in the Draft and Final EIR. They estimated a total of 24.5 cargo aircraft flights per day in the year 2000, of which Massport assigned 12 to BIF.

Potential tenants have indicated their likely long term needs as follows:

Northwest Orient	2	747 positions*
Air France	1	747 position
Flying Tigers	3	747 positions
American Airlines	2	747 positions
Federal Express	1	747 position** or equivalent
Emery	1	707, DC8, DC9 or 727 position
Airborne	<u>1</u>	707, DC8, DC9 or 727 position
<u>TOTAL</u>	11	positions

* One position to be used for remote parking and line maintenance of their passenger aircraft.

** To be shared by one DC-10 and 2 727 flights per day.

The program described in Section 1.2 of this Chapter provides for 6 747 apron positions in Air Cargo Area I, 3 or 4 707, DC8, 727, or DC9 apron positions in Cargo Area II, and a modest capability for smaller itinerant cargo and charter aircraft sharing apron space with general aviation aircraft in the Bravo I and Bravo II areas.

Summary:

Considering the broad range of uncertainty in all of the planning elements of BIF cargo facilities design, it is Massport's view that the cargo facilities being proposed provide a reasonable capability to meet likely cargo demand through the

year 2000. It should be emphasized that Massport intends to construct these facilities only in response to emerging demand. The current plans represent the maximum foreseeable cargo development for which space is reserved on BIF and for which analysis of environmental impacts is provided in the RFEIR/FEIR/DEIR.

1.1.4.2. Diversion of Air Cargo to Other Regional Airports

Commentators on the Final EIR have requested that Massport evaluate the possibility that major air cargo processing facilities of the kind described for BIF might be provided at one of the other regional airports. Underlying these requests is the recognition that several other airports in eastern Massachusetts meet the aircraft operational requirements for an air cargo center, and have lesser traffic and/or community impacts than Logan. The commentators speculate that excellent air cargo facilities could be built at airports which not only have better highway access and fewer potential environmental problems but in some cases, are actively seeking air cargo growth. Massport recognizes the potential for air cargo growth at these outlying airports and has, in the case of its own reliever airport (Hanscom Field in Bedford), made affirmative provisions both in the Hanscom Master Plan and, the Hanscom Field Rules and Regulations for future air cargo growth.

At the same time, it must be recognized that there are certain economies of scale which attract air cargo operations to Logan as the region's hub airport. For instance only about 40%

of Logan's freight is currently shipped in all-cargo aircraft, the remainder being shipped in the lower or "belly" holds of regularly scheduled passenger planes. Industry analysts expect the percentage of air cargo on all-cargo freighters will decline substantially in future years (to between 20% - 30%), with corresponding increases in belly freight tonnage, so that passenger aircraft lower holds may carry as much as 70% of cargo tonnage shipped annually. In view of the increasing dominance of belly freight, it is obviously inefficient to operate all-cargo aircraft at a different airport from passenger aircraft and lose the flexibility of alternate shipment choices, the opportunity for interline transfer between freighter and passenger flights, and the economies of operating one air cargo operation for both freighter and passenger shipments.

Moreover, the BIF site for the regional cargo facility under review here makes good planning sense in light of the uncertainties in forecasts for total cargo demand discussed in the previous Section 1.1.4.1. As explained there, Massport has adopted a flexible stance in site planning and design which permits the construction of only that amount of building which is required to satisfy actual demand. Should that demand not materialize, because, for example, other airports in fact command sufficient competitive advantages to draw carriers or freight handlers to their locations for predominantly all-freighter carriage, Massport has reserved the capability to employ BIF land areas for more profitable aviation-related uses and is not committed to building duplicative cargo facilities at Logan.

Thus, the implementation of the BIF project as outlined in this report does not exclude possible diversion of air cargo to other Massachusetts locations. At the same time it seeks to exploit fully the considerable economic and other advantages of a regional air cargo facility which is integrated with passenger operations.

Despite these advantages, nevertheless, possibilities exist for all-cargo charter or express package services at other regional airports when the shipper's needs will allow isolation from the larger hub network. Federal Express conducted its express operations out of Hanscom Field successfully during the period from 1973 to 1978, since they are a purely origin/destination carrier having no need to interconnect with either other freight carriers or with passenger flights. However, Federal relocated their operations to Logan in order to secure the ground handling facilities and infrastructure required for its larger aircraft, which were unavailable at Hanscom, and to take advantage of the better ground access to its prime Central Business District market.

One last disincentive to freight operations at remote airports is the need for basic airport infrastructure such as multiple Instrument Landing Systems serving all wind directions with all-weather landing capability; heavy duty runways, taxiways and aprons which can accommodate the higher gross weights of freighter aircraft; and other freight processing facilities with which to share incremental costs. While none of these infrastructure elements is impossible to provide at remote

airports, it is obvious that an extensive duplication of facilities already existing at Logan would be required.

1.1.5. Environmental Requirements

Logan Airport is uniquely situated as a major city hub airport at the center of the Boston region, adjacent to Boston's downtown, to Boston Harbor and to Boston's seaport. Moreover, it is located in East Boston and borders directly on several densely settled residential communities which for the most part preexisted the expansion of the airport into the major facility which we know today. These facts constitute a major positive opportunity for maintaining and enhancing Logan's value to the Boston region, but also represent a fundamental constraint on Logan's future development and operation. In particular, the fact of Logan's direct and substantial impact on the East Boston community, among others, has produced the historically dominant environmental issue affecting Logan's relationship to its environment: namely, the generation of noise from aircraft activity. The historical dimension of this relationship is outlined in Chapter 3 of this Report.

While aircraft noise continues to be the central issue, Massport has recognized other aspects of the environmental impact of its facility on surrounding communities. One such impact involves movement of cargo and other trucks through these communities, particularly the Jeffries Point neighborhood, to and from Logan. Another concern, although not in any sense equal to the problem of aircraft noise, is the movement of automobile traffic through these communities to the airport.

In light of the dominance of the noise issue in terms of Logan's environmental impacts, Massport may reasonably permit development of the airport only by also acting to reduce airport-generated noise, especially aircraft noise, to the maximum feasible degree. The Bird Island Flats project must therefore encompass a number of specific environmental requirements:

(1) Establish a transitional land-use zone which will lie between portions of the airport used for aircraft and direct airfield activities and the off-airport, residential community in Jeffries Point which is immediately adjacent to BIF and the water's edge, and which is the community most directly and severely impacted by operations on BIF. This land-use transition zone must include land-uses which are aviation-related but not productive of noise impacts from taxiing or parked cargo, passenger or other aircraft.

(2) Establish a set of land-uses which permit the construction of effective barriers, visually and acoustically, of noise from aircraft operations which will be generated on the portions of the BIF site assigned to cargo and related activities, as well as from certain other aircraft activities associated with operations of the Eastern and U.S. Air facilities on the southern side of Logan immediately adjacent to BIF proper. This buffer must shield the community in a fashion which promises a reasonable degree of relief from noise impacts especially at night.

(3) Establish land-uses which minimize--to the maximum feasible degree consistent with other essential policy and operational criteria discussed in this section--the traffic and related environmental impacts associated with airport development. These impacts include truck as well as auto traffic, the former having far greater prominence in terms of concerns expressed in the impacted East Boston community, and relating directly to cargo activity at Logan.

In addition to the above concerns which frame the primary environmental impacts of the BIF development, Massport has also analyzed and taken substantial efforts in defining its proposed plan to minimize or avoid altogether a range of other impacts. These include, among others, potential water quality impacts and air quality impacts, as well as related impacts on nearby recreational areas. These were analyzed in the FEIR/DEIR and are further evaluated in Chapter 4 of this report. Also, Massport has recognized that it is a regional institution and is a member of the Metropolitan Planning Organization for the Boston region's federally-approved transportation planning process. As such, the Authority is prepared to take active measures, alone, where appropriate, or in concert with other state and local agencies with relevant jurisdiction, expertise and legal authority, to put in place overall transportation strategies which maximize travel to and from Logan Airport in transit or multiple-occupancy vehicles, and which minimize the burdens which Logan necessarily places on regional transportation facilities, including the Central Artery. The latter facility, of course, services all

major existing and proposed land uses and developments in the Boston regional core. Notwithstanding Massport's lack of control over Central Artery improvements and traffic management by the Commonwealth, this matter is taken into consideration in Massport's evaluation in this report (Chapter 4, Section 4.4, and Chapter 5, Section 5.3).

1.2. Definition of Proposed Development Plan

Following publication of the Final Environmental Impact Report in December, Massport continued its planning, design and development process for the Bird Island Flats program. Simultaneously, a reexamination of the basic project was undertaken in response to comments given to Massport on the FEIR. The net result is that Proposed Development Plan is presented in this section of the RFEIR in a form slightly adjusted from that shown in the FEIR.

First, Massport has continued its efforts during the process of design and engineering for the BIF project to gain still further aircraft noise mitigation from the design and building alignments used on the cargo portion of the BIF site. An adjustment has been made which does not represent a conceptual change in the PDP outlined in the FEIR and is different mainly in the sense that noise is reduced. This aspect of the refinement of the PDP is described in Section 1.2.1.

Second, Massport sought to take advantage of the results of its on-going market exploration for the mixed use zone, which continued during and after review of the FEIR commencing in

December, 1980. The result is that the generic mixed use component of the PDP outlined in the FEIR has been refined into a further, illustrative site plan which reflects current thinking about what the market for aviation-related mixed use development might sustain on the BIF site. This refined or adjusted illustrative site plan is completely consistent with the basic land-use mix included in the FEIR, as will be explained below in Section 1.2.2.

1.2.1. Cargo and Related Activities

As mentioned above, the Proposed Development Plan for this portion of the BIF site (see Illustrative Site Plan, Figure 3) has been adjusted as follows:

(1) Certain portions of the main cargo building envelope (Air Cargo Area I) were realigned to a north-south orientation in the interest of achieving additional mitigation of aviation noise potentially emanating from aircraft and related activity in the immediate area and to be more reflective of anticipated trends toward belly cargo growth.

(2) One of two freight forwarder buildings shown on the southern portion of the site (Air Cargo Area II) was realigned to an east-west orientation in order to achieve certain operational efficiencies in the use of apron space which became appropriate upon making the building alignment modification in Air Cargo Area I.

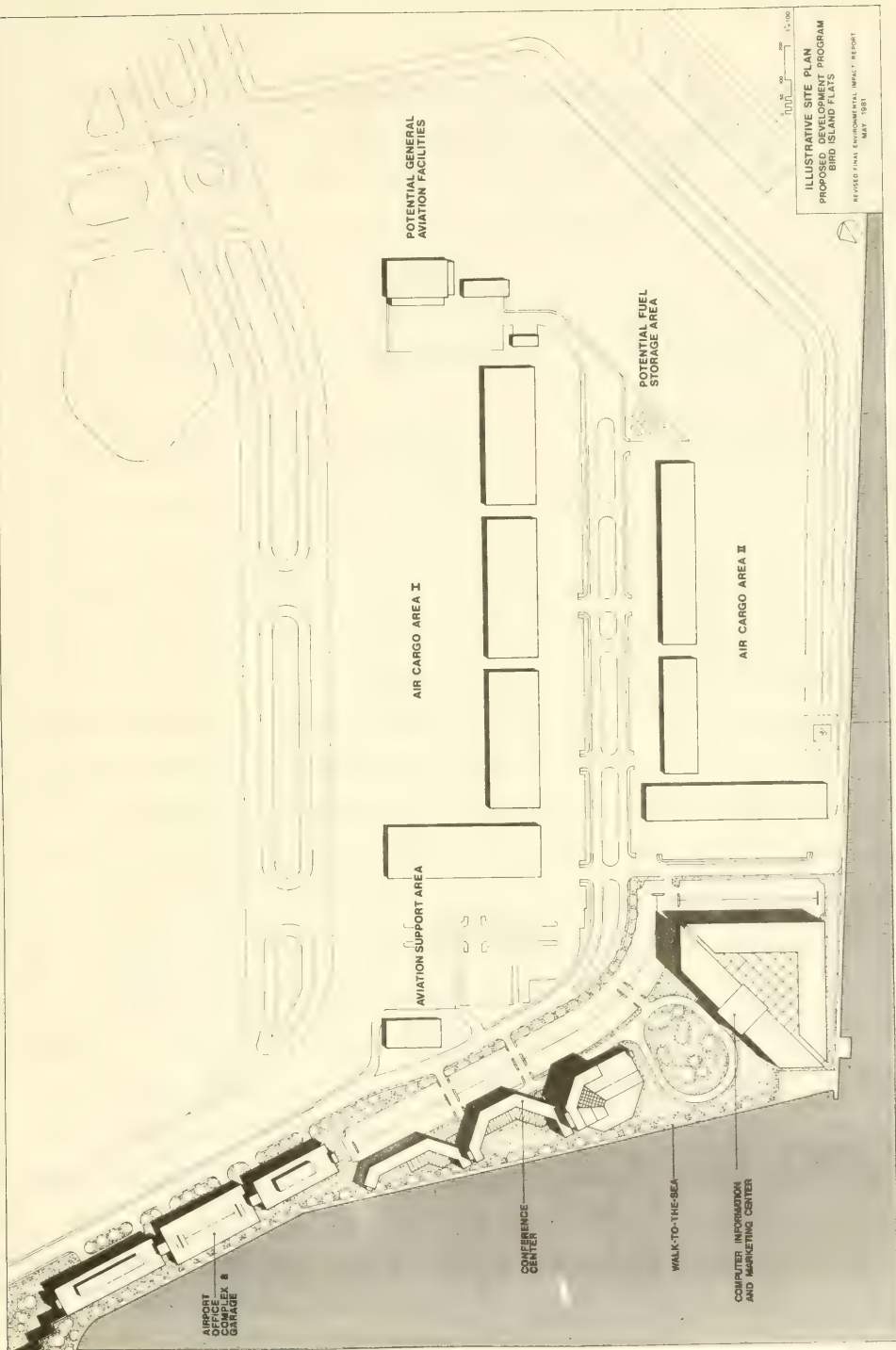


FIGURE 3

The resulting cargo elements of the PDP, in contrast with similar elements of the PDP as described in the FEIR, may be summarized as follows:

<u>USE</u>	<u>FEIR PROGRAM</u>	<u>RFEIR PROGRAM</u>
150' Deep Air Cargo Building with Apron	285,000	217,500
w/out Apron	-0-	67,500
100' Deep Air Cargo Building with Apron	53,000	106,000
w/out Apron	106,000	53,000
TOTAL CARGO BUILDINGS	444,000	444,000

These elements may be further described as follows:

1. Air Cargo Area I: 285,000 s.f., 150 foot deep cargo building envelope fronting on aircraft apron, with one change from the FEIR program. As a noise mitigating measure, the westerly portion of the building envelope in Air Cargo Area I will be constructed in a north/south alignment as opposed to the east/west alignment originally proposed. Some of the activities without supporting aircraft apron originally proposed to be located in the southern part of the project area (Air Cargo Area II) will be shifted north to replace the apron-accessed air cargo activities displaced by the building alignment change. Total aircraft parking on the main apron in Air Cargo Area I will be reduced by 2 aircraft positions. A discussion of the noise mitigation benefits of the proposed air cargo building re-alignment is contained in Chapter 5, Section 5.2.2.

2. Air Cargo Area II: 53,000 s.f., 100 foot deep cargo building envelope fronting on aircraft apron increased to

106,000 square feet; also, 106,000 s.f., of 100 foot deep cargo building envelope without fronting apron, reduced to 53,000 square feet. The latter 53,000 square feet of the original total is now proposed to be aligned east/west as opposed to its original north/south configuration, and to be connected to air cargo facilities with apron space. The activities originally proposed for this space are proposed to be shifted north, as explained above.

Total air cargo operations capacity in compared to the FEIR program elements 1 and 2 will remain relatively unchanged by the RFEIR building alignments, but some aircraft operations will be shifted to apron areas in Cargo Area II which are further removed from the adjacent residential community.

3. 15,000 s.f., support building envelope (unchanged from FEIR program). If needed, this facility will be constructed in the area designated "Aviation Support Area."

4. 6,000 s.f., GA/Itinerant cargo support facility envelope

During further engineering studies, it was determined that if GA was to be moved to BIF, these facilities should be located on the extreme easterly end of the main air cargo building envelope. In addition, the PDP includes a possible 26,000 square foot GA hangar. All of this activity is shown on the PDP for illustrative purposes only. A decision will be made in the future regarding the extent to which GA facilities will be located on the BIF site or on North Apron. (The FEIR, it should be noted, analyzed GA-related impacts at both potential locations).

5. 700,000 s.f., GA/Itinerant cargo apron (unchanged from FEIR Program)

6. 40,000 s.f., helipad and helicopter parking (unchanged)

The exact location of this helipad/parking area will be determined during final engineering and design.

1.2.2. Mixed Use Element of Proposed Development Plan

For comparative purposes, the PDP as outlined in the FEIR and as refined for purposes of this report is as follows:

FEIR Program

General Office Space	500,000 s.f.
Research and Development/ Light Industry	300,000 s.f.
Hotel/Conference Center	350 rooms
Parking	1,800 spaces

RFEIR PROGRAM

Computer Information and Marketing Center	500,000 s.f.
Conference Center	300 rooms
Airport Office Complex	120,000 s.f.
Parking	1100 spaces

Each of these elements is more fully described below.

Computer Information and Marketing Center

The prime mixed use development site is the area at the western edge of Bird Island Flats, framed by the new access road and the westernmost freight forwarder facility. This portion of BIF, with its larger site area and desirable views of Boston Harbor and the downtown central business district, has been assessed by Massport's developer-advisor as especially attractive for a development having potentially the most substantial economic return generated by any use in the entire BIF program. In particular, market research and discussions with potential users which have taken place both before and after the publication of the FEIR late in 1980 have shown that establishment of an exhibition and marketing center for computer, telecommunications and information processing equipment would be a highly profitable and desirable use of this particular portion of BIF.

The computer has evolved over the last twenty years from a limited tool in performing specific computational functions to ever-broadening technological applications in business, government and private life. These applications have been encouraged by increasing awareness of and demand for the benefits afforded by this new technology, and by significant reductions in the costs of these products.

Currently, a prospective buyer who wishes to inform him or herself as to the latest products on the market must either visit individual manufacturers facilities, which makes ready comparison of advantages and disadvantages of competing product lines very

difficult, or the buyer may attend various trade shows put on by major manufacturers around the country, at great cost to both buyers and seller-manufacturers. The proliferation of new products and an expanding market has created a definite need for a central information point where the latest product innovations can be examined, tested and purchased. An exhibition center for computer, telecommunications and information processing technology would provide the industry with a means of displaying their products in timely fashion and in an atmosphere conducive to exchange of information and to more thoroughgoing explanations of product characteristics to prospective buyers.

The precedent for permanent trade facilities in other more mature industries are numerous. Examples include Los Angeles' Design Center, Dallas' Trade Market, Chicago's Merchandise Mart, and New York City's Design/Decorators' Centers. These facilities have been extremely successful in improving the efficiency of the purchase process for buyers and the sales process for vendors.

The computer market center will include a year-round exhibit of both domestic and world-wide computer telecommunications and information products by major manufacturers. It will be comprised of leased showrooms which will be custom designed to the particular needs of each occupant. Office areas for sales, technical and support staff will be incorporated into each showroom facility.

In particular, the center will include the following basic activity areas:

COMPUTER CENTER PROGRAM (BIF)

PUBLIC SPACE (1st and 5th floors)	106,000 sq. ft.
o permanent and theme exhibit space (25,000 sq.ft.)	
o museum (5,000 sq. ft.)	
o auditorium (6,000 sq. ft.)	
o seminar rooms	
o executive dining and cafeteria	
PRIVATE TRADE MART (2-4th floors)	308,000 sq. ft.
o leased showroom and office space	
o resource center	
ADMINISTRATIVE/ACADEMIC	19,000 sq. ft.
o admin/building management	
o program management	
o technical control	
o audio visual studio	
SUPPORT SERVICES	67,000 sq. ft.
o shipping/receiving	
o shops	
o maintenance	
o utilities	
TOTAL	<u>500,000 sq. ft.</u>

As can be expected, the center will offer each occupant and exhibitor a full range of electrical, mechanical and communication facilities. Professional and administrative support services will also be available on a full-time basis for exhibitors' use in maximizing ease of operations, including set-ups alteration and movement of exhibits.

Portions of the center will be available to the public in addition to exhibitors and buyers. The public area, which will

be accessed by a separate entrance, will focus on consumer electronics, and personal computers of interest to the general public. An auditorium for occasional public demonstrations, shows, or lectures, and a lounge area will also be included.

The Center's location in Boston and at Logan Airport is crucial for many reasons. The Boston area is widely recognized as an international focus for high technology development. For data processing and telecommunications professionals faced with the responsibility of making new acquisitions of computer hardware or software, a visit to this area, most often by air travel, is essential. Boston is also recognized as a world center of higher learning. The Massachusetts Institute of Technology which has provided much of our early computer technology is located in close proximity to the Center. Harvard University as well as 33 other colleges and universities are within a short radius of the Center. Moreover, the proximity to national and international airlines at Logan will ensure that travelers can easily reach the Center and still be accessible to the downtown Boston business community. On the other hand, local industry sales representatives will be well positioned to provide maximum service to prospective customers at minimum cost to the industry since they will be permanently stationed in facilities at the same airport which they currently use to reach clients. Logan's growth and prominence as both a passenger airport and regional air cargo center has paralleled the development and maturation of Massachusetts high technology industries. With such a dependent relationship as a background, Massport believes

that location of the computer information and marketing center at Logan is both natural, and mutually beneficial to the industry and to the health of the airport.

A related and fundamental point concerning the advisability of locating this proposed center on BIF should be noted. There is currently no similar computer, telecommunications and information processing marketing center in the United States. Massport is aware that the concept is under active investigation in several urban areas outside of the Boston region. There is the substantial likelihood that given the center's unusual characteristics and capital intensive development costs, only one such center can be accommodated on the Eastern seaboard if not in the entire United States. If the Boston region is to capture the opportunity which this kind of exhibition and marketing center represents, it is mandatory that a public institution with sufficient resources take expeditious action to secure an economically viable and environmentally appropriate site for this development concept. Beyond the fact that Massport is necessarily concerned to obtain for the public programs which it conducts the anticipated economic returns which such a center would generate, Massport is also unaware of any site in the Boston core which offers the unmatched aviation access, abundant amenities, downtown image, water access, and historic location provided by the BIF site. These characteristics have been viewed by Massport's developer advisor as key to the success of such a center in Boston. In this sense, the question whether to develop the center on BIF is the only true "build" versus "no-build"

question emerging from the various aviation-related mixed uses otherwise considered for this site, in that if the center is not located on BIF, it will very likely find an equally attractive site in another urban area outside of the New England region. As will be seen in the descriptions which follow, the other potential uses for the BIF site have strong connections with Logan Airport, and will most likely seek to locate nearby at off airport locations (however appropriate or inappropriate such sites may be) if space is not provided on BIF.

Conference Center

Immediately to the north of the computer information and marketing center, Massport is proposing a 300-room conference center. Originally, Massport had contemplated the construction of a 350-room hotel/conference center at Bird Island Flats. Based on its marketing evaluation before and after publication of the FEIR, Massport has refined its proposal to include an exclusive conference center, which will appeal to longer term business or professional conferences, and which will not be available to tourists or normal airport travellers. The Logan Airport location will ensure that conference attendees will be able to reach the center easily by plane and Massport mass transit, thereby reducing auto trip generation on as well as off-airport. Only limited parking designed to provide largely for employee needs will be provided, and that parking will be limited in the context of an aggressive employee carpooling and vanpooling program for Logan employees (see Chapter 5, Section 5.3.1).

The Logan Conference Center will provide a setting for daylong conference meetings without the usual distractions found in downtown hotel locations. The conference center concept stresses the creation of a unique learning environment, in specialized meeting facilities. Meeting participants will also enjoy easy access to tourist attractions in downtown Boston during the evening hours by a wide variety of transit choices: MBTA; taxi service; and potential limousine service. Moreover, ferry service to and from Boston's downtown as well as Massport's Commonwealth Pier development may be provided should Massport's current evaluation of ferry service options and impacts conclude that such service is feasible and practicable.

The exclusive conference center concept offers the opportunity to strengthen and complement the marketing services provided in the nearby computer and information marketing center. With this unique combination of urban location, extensive services, and ease of access to airlines, it is expected that Bird Island Flats will evolve to be one of the premier high technology information environments in the nation, and should assist the U.S. industry in retaining a competitive position vis a vis similar industries in other countries.

Airport Office Complex

Another element of the proposed mixed use development is a moderate sized airport office complex. This facility will be located in the northwest portion of Bird Island Flats in the corridor between the new access road and Jeffries Point Cove, in the area currently bordering outer taxiway.

The proposed office complex illustrated on the site plan consists of office buildings, three to four stories in height, as well as a 425 car parking garage, also approximately 40 feet high. The function of the office facility is twofold. First, it will provide much needed office space opportunities for businesses and regulatory agencies currently located on-airport, but desirous of securing additional expansion space for future needs. Market studies by Massport have shown an existing market for such space among both public agencies and private, aviation-dependent businesses. Secondly, the proposed office complex will also provide high quality office space rental opportunities to potential users not currently located at Logan, but desiring to be on-airport, including, for example, consulting firms and regional industry sales forces who need facilities conveniently located close to Logan airlines. If these activities do not locate at Logan, then they will locate near the downtown area and will produce similar traffic impacts on congested roadways.

Parking Spaces

Massport continues to propose a significant number of additional parking spaces for inclusion in the proposed BIF development. In doing so, however, Massport has taken into consideration the effects of an aggressive set of mitigation measures involving reduction in single-passenger auto traffic to and from the site, especially by BIF employees. These measures are considered in Chapter 4, Section 4.4.2, and in Chapter 5, Section 5.3 of this report.

Massport's view is that the number of parking spaces proposed for inclusion in the project (some 1,100 spaces in the program illustrated for purposes of this report in contrast with some 1,800 spaces outlined in the generic program discussed in the earlier FEIR) can sustain the level of development which is described above. This level of parking is based on Massport's best estimate of the mode split for transit and automobile travel likely to occur for airport-related travel based on current information regarding the demands made by the market for the mixed use activities included in the plan. It is nonetheless important to observe that, as for cargo handling facilities discussed above at Section 1.1.4, there inevitably are uncertainties associated with any market analysis regarding demands for particular kinds of commercial space and the degree to which a given density level must be accommodated with automobile parking for its users. Massport has therefore adopted a conservative stance in assuming that the current market will sustain only the proposed density of mixed uses at the parking levels included in the revised PDP. However, it should also be recognized that if existing trends towards greater ride sharing and increased transit usage intensify, in the context of rising fuel prices and changing market perceptions, it would be quite possible to sustain further development of the mixed use zone (i.e. increased square footages for office or other uses) or a different mix of such uses with the same level of parking and the same basic traffic impacts of the proposed development in this report.

A well-designed office complex will enable Massport to achieve its multiple objectives of providing additional revenues, improving land use, enhancing the visual and acoustical environment at Logan Airport, and establishing an essential transitional zone between noise-generating aircraft activities and the residential community.

Public Recreational Access to Boston Harbor

Another feature of the Proposed Development Plan is the provision for a public access way along the western edge of the Bird Island Flats project area, parallel to Jeffries Cove. This "walk-to-the-sea", would allow the general public to take advantage of the enhanced pedestrian environment provided by the mixed use development. A pleasantly landscaped, well-maintained, walkway along the Jeffries Point Cove will be created which will extend from Maverick Street in the north to the southwestern tip of the BIF project area facing downtown Boston. This public access corridor will thereby provide members of the general public with pedestrian access to portions of Jeffries Point Cove which are currently inaccessible, to the BIF mixed use area, and to any ferry service which may be added in the future. It will also facilitate access to the striking views of Boston Harbor and the Boston skyline which are available from Bird Island Flats. This access way, with its park-like setting and unique views, together with the existing Porzio Park and with the continuous recreation area along Jeffries Point Cove which Massport will make every effort to provide (see Chapter 5, Section 5.1), will

constitute a major environmental amenity to be shared by airport users as well as by the adjacent community.

1.3 Specific Needs Met By The Proposed Project

In this portion of Chapter 1, Massport reviews certain needs met by its proposed project and specific benefits which the project will provide.

1.3.1. Economic and Financial Advantages of the Mixed Use Component

We have reviewed in Section 1.1.2. above Massport's overall financial requirements affecting Bird Island Flats development, as well as specific cost recovery policies applicable to Logan Airport. We examine briefly in this section certain financial issues associated with the development of the BIF landfill area which must be resolved through any BIF project, and which the mixed use component included in the revised PDP addresses successfully.

First, as we noted above, the BIF area is landfill in the inner Boston Harbor created in a previous period. The original costs of the fill, drain and dike associated with the BIF project area are some \$13.4 million, of which some \$3.2 million is allocable to the transitional mixed use zone. These costs are currently being included in the cost basis of the landing fee, with nearly \$1 million in annual costs due to the entire BIF project area, of which some \$265,000 annually is attributable to the mixed use area. Massport must continue to recoup annually

the amortized charges for the historic landfill costs from available revenue sources, whether from the landing fee, from lease income or from economic returns arising from a mixed use development.

Second, construction of mixed use office or other structures in the transition zone would provide the acoustical and visual buffering of aircraft noise sources which is an essential criterion for the BIF project. In the absence of such development, however, a passive buffer wall would necessarily have to be constructed (note that there is a 1979 state law requiring construction of such a wall). This wall would consist of at least a 1000 foot section having a construction cost estimated between \$2.5 and \$3.0 million. At an interest rate of 11% plus coverage of necessary reserves under Massport's trust and other obligations, Massport must recoup approximately \$500,000 annually in charges for the portion of the transition zone covered by the wall, including original land, drain and dike costs allocable to that area of the site.

Third, should a passive wall rather than an active development approach be implemented, Massport would lose the opportunity to earn a substantial economic return expected from an office or similar development in this area of the mixed use site.

Fourth, Massport has sought to achieve through its Proposed Development Plan a balanced program which responds to the region's need for improved, on-airport cargo handling facilities while also generating sufficient economic returns to meet the

basic financial criteria applicable to Massport generally and to Logan in particular. In doing so, Massport must weigh the extent to which it can reasonably expect to obtain from those cargo carriers placing high priority on apron access sufficient return in the form of ground rentals and other charges to cover land, apron, roadway access, construction and other costs. It would appear likely that while Massport will exact substantial charges from its cargo carriers for use of on-airport space, some of these costs will need to be absorbed by other income sources, including both the landing fee and the economic return expected from a mixed use development.

With these factors in mind, Massport has determined that from an economic and financial point of view, the inclusion of the mixed use element of the BIF program will have considerable advantages not duplicated by a program without mixed use development. These include increased flexibility to permit recoupment of historic landfill costs for the BIF area, and increased income from aviation-related development which can help finance needed improvements elsewhere at Logan including essential portions of the cargo development proposed for BIF. Accordingly, over and above the environmental, land-use and other advantages of the mixed use development which are discussed elsewhere in this report, the mixed use component of this proposed project is an essential element without which the project would not be feasible. Given this fundamental interdependence, Massport has determined to go forward with the combined cargo and mixed use development under review in the RFEIR.

1.3.2. Additional Benefits of the PDP

In addition to the positive effects of the Proposed Development Plan listed in the FEIR and discussed elsewhere in the RFEIR, the revised PDP will provide the following benefits:

- o 1500 construction jobs over the next five years divided between 900 jobs involved in air cargo facility construction, and 600 jobs involved in construction of the commercial development complex. The estimated \$125 million project construction costs would result in employment of the full range of construction industry skill groups due to the complex nature of the proposed facilities.
- o Up to 2,200 permanent jobs, skilled, semi-skilled, and unskilled, divided between 1300 cargo related jobs, and 900 jobs in the commercial development section.
- o Direct and indirect stimulation of the local and regional economy by the purchase of materials during construction, and services during operation of the facilities.
- o Additional revenues to the City of Boston in the form of in-lieu-of-tax payments, which Massport will require potential commercial developers at BIF to negotiate with City officials as a condition of their designation at Bird Island Flats. Coupled with Massport's annual in-lieu-of-tax payment this

will represent a substantial funding resource to the City.

1.4 Timetable For Implementation of Proposed Development Plan

Construction of the Proposed Development Plan described in this report will naturally occur over a series of years, and full development of both the cargo and mixed use portions is not expected to be completed until the forecast year - 1987. Construction of the two parts will proceed in a coordinated fashion as described below:

Phase I

1981 - 1983

- o 17 foot temporary noise barrier along Maverick Street completed during first 4-6 weeks of project construction.
- o completion of detailed analysis of on-airport, low capital roadway management and improvement program, 1981 and implementation of improvements, 1981-82.
- o approximately 1/3 of Air Cargo I area, up to 2 747 positions, completed 1982, 2 additional positions, 1983.
- o 100% of GA relocation, 1982-83.
- o 50% of Air Cargo II apron with handling facilities completed or committed, 1983.
- o 50% of Air Cargo II cargo handling facilities completed or committed, 1983.
- o permanent BIF roadway 1983.
- o completion of Airport Office Park and Walk to the Sea, 1983.

- ° completion of Computer Information and Marketing Center (1983-84).
- ° designation of developer for the above mixed use improvements, 1981.

Phase II

1984 - 1987

- ° remaining 1/3 of Air Cargo I apron completed.
- ° 100% of Air Cargo I handling facilities constructed.
- ° remaining 50% of Air Cargo II apron completed.
- ° remaining 50% of Air Cargo II handling facilities/forwarder buildings completed.
- ° permanent helipad location at Air Cargo II apron area.
- ° completion of Conference Center facility.

CHAPTER 2 - DESCRIPTION OF ALTERNATIVES

The basic alternatives to the Proposed Development Plan remain the same as those presented in the FEIR. They include the following:

A. No Action Alternatives

1. No-Build - (with complete reconstruction of the North Cargo Apron and General Aviation on the North Cargo Apron) (Figure 2-5 in FEIR at p. 2-1).
2. Revised No-Build - (with the North Cargo Apron essentially as is, and GA at its current location) (Figure 2-6 in FEIR at p. 2-1).

B. Cargo Only Alternatives

1. Low Intensity Cargo Development - (with GA on Bird Island Flats or on North Cargo Apron) (Figure 2-4 in FEIR at p. 2-1).
2. High Intensity Cargo Development - (with GA on BIF or on North Apron) (Figure 2-3 in FEIR at p. 2-1).

C. Cargo and Mixed Use Alternatives

1. High Intensity Cargo Development With Mixed Use Development (DEIR) - (with GA on BIF or on North Apron) (Figure 2-2 in FEIR at p. 2-1).

2. Proposed Development Plan (FEIR) (derived from the above alternative, with GA on BIF or on North Apron, or split between both locations) (Figure 2-1 in FEIR at p. 2-1).

In this Chapter, we review options which were suggested to Massport during the extended comment period for consideration either as alternatives to the PDP which were not treated in the FEIR (e.g. a total mixed use development of BIF) or as design variants to the PDP (e.g. a "diagonal" alignment of the main air cargo building).

As noted in Chapter 1, the PDP described in this report ("revised PDP" or "RFEIR Program") represents a refinement of the generic PDP outlined in the FEIR published last December, and is illustrative of specific uses of the mixed use zone which Massport's market analysis indicates are in substantial demand for location on or near the airport. As such, the RFEIR program falls entirely within the confines of the Proposed Development Plan evaluated in the FEIR and does not therefore merit treatment as a new or separate alternative for the BIF project. The differences in environmental impact which are expected to result from the implementation of this revised PDP in contrast with the development concept embodied in the FEIR program are all environmentally beneficial and are described in Chapter 4.

2.1. Cargo Only/No Mixed-Use Development

Certain commentators have urged the Port Authority to abandon the mixed use element of the Proposed Bird Island Flats

development and to establish instead a total cargo, airfield and/or airline support program. Two basic reasons cited for this approach were: (1) the use of an airport for purposes such as the proposed airport office park, conference center or computer and information marketing center was inappropriate in overall land-use terms; and (2) the development of a portion of the BIF site for such purposes would create traffic impacts which were considered to be unacceptable.

Massport evaluated the concept of a cargo only development in both the Draft and Final EIR. However, following publication of the FEIR and partly in response to the position announced by the Secretary of Environmental Affairs following the close of the FEIR comment period, Massport again conducted a review of the appropriateness of a mixed use component of BIF development in contrast with an all-cargo and airline support program. The results of that review are summarized below.

2.1.1. Land-Use/Environmental Considerations

As we have outlined in Chapter 1, Section 1.1.2, there already exists a substantial demand for the location of a range of activities on or close to Logan Airport, including certain cargo or freight handling uses as well as aviation-related development such as office space, hotel and conference facilities. These demands for airport-related space are expected to intensify rather than to decline, and the sites of appropriate land-sites with which to accommodate this demand are becoming increasingly scarce. Also, the location of at least some of

these activities in residential communities immediately adjacent to Logan could have substantial adverse environmental and other impacts and could severely conflict with the efforts of those communities to maintain their character and stability in the face of development pressures induced by Logan's operations.

One of the fundamental land-use objectives of the BIF project, therefore, is to guide and direct growth in airport-related development through a program which organizes the use of the available space on the BIF site for high priority, aviation-related uses. These activities include cargo handling facilities requiring aircraft apron space and supporting facilities, commensurate with reasonable estimates of demand for this kind of facility; office space for aviation related purposes; and a conference center and computer marketing center, both of which are heavily dependent on immediate access to airline terminals. Moreover, Massport's market analysis has indicated that if the computer exhibition and marketing center is not provided space on a site with the characteristics and appeal of BIF, prospective operators will quite likely seek another site located outside of the Boston region, and perhaps entirely outside of the Commonwealth of Massachusetts. These mixed uses, together with the cargo activities proposed for location on BIF, thus represent a systematic program to maximize the utilization of the Flats for land uses for which there is an identified market demand for location on or very near the airport and to minimize the use of BIF for activities which can appropriately locate elsewhere. Another basic objective is to establish a

transition zone which insures that the critical area lying adjacent to the water's edge along Jeffries Point Cove is kept free of noise-generating aircraft and support activities. The revised PDP serves this objective by accommodating aviation-related development which does not generate the environmental impacts associated with aircraft and airfield activities, such as those taking place to the east on BIF and on other sections of the airfield and terminal areas. The approach embodied in the suggestion of a no mixed use/all cargo program would seriously conflict with this objective by permitting environmentally incompatible, noise-generating aircraft and cargo activity to take place immediately adjacent to the water's edge and the close-by residential community in Jeffries Point. This land use approach would depart from the policy commitments made in the master planning process for Logan's future growth and would ignore important historical factors affecting the environment of the residential community impacted by Logan operations (discussed in Chapter 3 of this Revised FEIR).

Still another environmental objective of the BIF project is that it must affirmatively buffer or shield the adjacent community from aviation noise created by aircraft movements, cargo handling and related activities. The total cargo/aircraft support concept would violate this standard for BIF development unless the Authority were to design and construct not only the 1000 foot wall which is proposed by certain commentators as a preferable approach to noise mitigation, but also an extended wall running virtually the entire length of BIF's western edge (a

total of approximately 2800 feet). This longer wall would be made necessary by the location of aviation noise-generating activities under the all cargo option in the southwestern section of BIF at points substantially closer to the nearby residential community than is the case under the integrated mixed use and cargo program embodied in the Proposed Development Plan. This passive wall form of buffer would have obvious visual impacts and would, indeed, constitute a severe intrusion into the visual environment of the Jeffries Point Cove area. This residential community, it should be underscored, has consistently rejected erection of a "wall" solution to the noise problem at BIF. Moreover, given that noise generating activities would be located substantially closer to the residential community under this approach, even the longer wall would not shield the community from the larger overall noise levels generated by an expanded cargo development. Accordingly, Massport believes that a no mixed use alternative would itself constitute a substantially inferior approach from an environmental point of view and would fail to meet the environmental standard which is included within Massport's legal mandate by virtue of the Massachusetts Environmental Policy Act.

2.1.2. Traffic Impacts

The development of Bird Island Flats exclusively for cargo and aircraft support uses would serve to reduce automobile traffic which is associated with the mixed use component of Massport's proposed development plan and which would enter and

leave the BIF site on the airport's roadway system. It should be pointed out however, that Massport has carefully evaluated the traffic impacts of BIF development on its internal roadway network, and has determined that the level of traffic associated with the revised PDP is well within the margin of acceptability in the operation of the Boston area's major airport.

Moreover, even if the BIF site were to become unavailable for the mixed use component of Massport's proposed project the regional transportation system, including the Central Artery at its merge points with the Sumner-Callahan tunnels, would not experience significant relief in levels of congestion. This is true, first, because BIF traffic associated with mixed use development is virtually insignificant in comparison with overall traffic levels which are forecasted for these regional facilities due to generalized growth from other land uses in the Boston region. In particular, the total P.M. peak hour traffic forecast for the RFEIR program in 1987 (discussed in Chapter 4, Section 4.4.) is expected to result in only a two percent increase at the northbound merge of the Sumner Tunnel and Central Artery.

Second, the absence of the Bird Island Flats acreage for the proposed mixed use component of the development will not preclude the location of such activities at other sites close to Logan. As noted in Chapter 1 and in the discussion immediately above, there already exists a substantial demand for office, hotel, conference and other "mixed" uses which are aviation-related and dependent on ready accessibility to Logan Airport. The accommodation of these demands at sites in East Boston or

elsewhere in the regional core will draw traffic to and from those sites on the same regional facilities available for access to BIF, including chiefly the Central Artery, the Sumner-Callahan tunnels, and the Mystic-Tobin Bridge. Massport is fully committed to assisting in whatever way reasonable the development and implementation of traffic strategies designed to deal with this major traffic issue for the Boston region (specific commitments are discussed in Chapter 5, Section 5.3.3.) However, it would be erroneous from a transportation point of view to assume that the development of BIF solely for cargo or aircraft support purposes would resolve this regional transportation problem.

Similarly, commercial activities which are airport-dependent but which are not afforded space on BIF will likely seek locations in areas such as the East Boston residential community. If these development pressures intensify and, for example, an airport office development or conference center or hotel locates on the other side of the airport boundary line in East Boston, community traffic impacts, which the Authority has sought to avoid through its project definition and mitigation policies, will instead materialize in a potentially uncontrolled manner. Massport will work to avoid this result, and, in addition to the specific traffic management strategy developed for purposes of the BIF project (see Section 4.3. and 5.3.), Massport will assist the East Boston community in developing land-use controls which will enhance the community's ability to organize and guide growth in its area. This aspect of Massport's commitments is considered further at Chapter 5, Section 5.2.2.

In addition, an all cargo approach to the development of BIF might very well exacerbate an already serious problem of truck traffic entering and leaving Logan Airport through the East Boston community. For example, Massport analyzed in the Draft EIR the option of "High Intensity Cargo" (with no mixed use) and found that it would generate at least 55% more truck traffic than the PDP outlined in the FEIR. This is because the high intensity cargo alternative necessarily devoted a substantial portion of the BIF site earmarked for freight forwarder activities. Because freight forwarders receive multiple shipments by truck and consolidate these into large loads for delivery to an air cargo carrier, locating larger numbers of forwarders on BIF would increase significantly the numbers of truck trips to and from Logan.

2.1.3. Economic and Financial Disadvantages

As noted in Chapter 1 of this RFEIR, Massport faces a serious challenge of finding increased and diversified sources of revenue with which to develop and maintain its existing airport, bridge and seaport facilities. This is essential if Massport is to continue to operate without placing new burdens on the Boston area's tax structure which is already experiencing severe pressures. The proposed mixed use development would meet these needs by providing a significant new source of income for Massport which would be integrated with and to some extent absorb other airport and airfield costs which continue to grow at significant annual rates.

Thus, a preliminary calculation of the projected return to Massport of the Proposed Development Plan indicates that a successful mixed use development will not only allow for the removal of related original landfill costs from the landing fee, but will provide considerable flexibility in establishing base land rent costs of the air cargo development. In the event that mixed use development did not occur, Massport would act as required under its Enabling Act to establish substantially higher land rents or other charges for the air cargo facilities, thereby inhibiting the development of air cargo capacity for the region; and/or assess a greater portion of excess costs of these specialized, exclusive facilities to all Logan users through the landing fee, lease income, concession income or other user charges.

Indeed, the potential effect on landing fees or other airport user charges of a total cargo and aircraft support development on Bird Island Flats, with a passive buffer zone, could be as high as \$2.4 to \$3.1 million per year calculated on a gross basis as follows:

	<u>Annual Costs</u>
Original landfill, air cargo apron area	\$ 318,000
Passive wall (1000' to 2800')	400,000 - 1,120,000
Air cargo aprons	1,418,000
Original landfill, mixed use area	<u>265,000</u>
	\$2,401,000 - 3,121,000

Although Massport will certainly need to continue to employ these user charges to cover increased costs of operating Logan Airport, it cannot simply ignore the potential implications of the scenario just shown by rejecting valuable aviation-related mixed use development in favor of a speculative and very likely uneconomic expanded cargo program.

2.2. Increased Mixed Use Commercial Element

Other commentators on the FEIR, including representatives of the impacted East Boston community, have suggested that Massport reduce the scale of cargo and other aircraft support development of BIF or that this portion be eliminated entirely; and that Massport increase utilization of the site for commercial mixed use purposes. As we have already noted, Massport finds that the 20 acres devoted to the mixed use area represents the minimum amount of space necessary to achieve an appropriate transition zone consistent with Massport's environmental, land-use and institutional objectives described in Chapter 1, and to achieve a developable commercial site of sufficient size and integrity. An increased mixed use concept might thus take form as a development of higher density on the same acreage already devoted to mixed use in the PDP. Such densification would potentially involve larger building footprints (with attendant greater foundation costs), higher buildings, and/or diversification of uses (e.g. airport-related housing). Alternatively, an increased/mixed use option might take the form of utilizing increased BIF acreage for aviation-related commercial development. We explore the latter option immediately below (Section 2.2.1.) and then turn to the increased density variant (Section 2.2.2.).

2.2.1. Increased Acreage Mixed Use Development

The increased acreage concept would have both advantages and disadvantages in contrast with the Proposed Development Plan. The concept essentially embodies a recognition that the BIF area is an extremely attractive, water-accessed site with a unique downtown image. It is indeed one of the few remaining developable sites in the inner harbor area (others which remain are also within Massport's jurisdiction). It would provide land area for profitable mixed uses over and above those included in the PDP. It would therefore augment the economic viability of the BIF development as a whole and comport with Massport's overall economic and financial aims to diversify its revenue base and maintain flexibility to set all of its user charges at reasonable levels towards recovery of total costs of Logan's operations. Additional development for aviation-related mixed uses on increased acreage might add significantly to overall site integrity and appeal by permitting improved definition among the parcels assigned to various BIF uses; increasing the potential for landscaped transitions among the uses; and greater flexibility in roadway design and in separation of access among different traffic types (e.g. cargo trucks, mixed use delivery vehicles, employee passenger cars and vans; visitor traffic). Obviously, additional construction jobs and permanent job opportunities would be created; attendant in-lieu-of-tax benefits

might increase. Finally, the establishment of a larger acreage for mixed use purposes could also serve to insure that noise-generating aircraft activities and related uses would locate still further away from the residential communities adjacent to the Jeffries Point Cove.

In the face of these potential advantages, Massport has not lightly chosen to undertake a more modest course in connection with the mixed use component of its proposed BIF development. However, several factors have led Massport to determine that a large acreage development for this aspect of the aviation complex at BIF would not be an appropriate course of action to pursue at this time.

First, Massport has sought to achieve a balanced development strategy which responds to needs for improved cargo processing facilities at the region's major hub airport while at the same time achieving the financial, environmental and other goals addressed by the mixed use component. As has been explained in Chapter 1, Section 1.1.4. forecasts of demand for air cargo facilities on-airport are subject to considerable uncertainties which militate in favor of reserving sufficient space on BIF, within the bounds of economic and environmental constraints, to accommodate sufficient apron space and related building areas for freight movement by all-freighter and passenger (belly) mode. Accordingly, it would be unwise at this time to unduly restrict the cargo area by removing substantial portions of the site from possible cargo use until and unless market forces develop which create a demand for a different approach.

Second, Massport has presented in this RFEIR a refined proposal which reflects actual market-generated demands for mixed use activity on BIF, as contrasted with the generic PDP outlined in the FEIR published last December. In presenting this market-based program, Massport has recognized that the traffic characteristics associated with it are significantly reduced in contrast with the characteristics carried for the FEIR program. Given the concerns expressed by certain commentators, including the Commonwealth's Secretary of Environmental Affairs, that Massport take affirmative steps to reduce traffic impacts of the mixed use element, Massport is prepared to go forward at this time with the revised PDP described in this report.

It should be noted, however, that one of the basic tools employed in the proposed development to control traffic impacts is the provision of a reasonably limited amount of parking for employees at the mixed use site. The number of proposed spaces (1100) is capable of sustaining the proposed density of development (in the context of the overall traffic management and mitigation program described elsewhere in this report, Chapter 5) according to current perceptions in the marketplace among potential BIF employees and users. Massport believes that this level of parking may come, in the future, to sustain additional increments of development at this site if market perceptions change and there is an increased tendency to travel by multiple-occupancy automobiles or transit vehicles, including potential water-borne ferry services. Should this take place, it is possible that an increased mixed use development would become

feasible at the basic level of traffic characteristics now associated with the RFEIR program. In that event, Massport would conceivably respond to actual demands which materialize to review additional mixed use development at BIF, including appropriate further environmental reviews.

2.2.2. Higher Density Mixed Use Development

Massport has also considered a higher density version of the mixed use element of the project on the same 20 acres previously earmarked for this type of development. Indeed, in the DEIR, the following program was described in contrast with that described in the FEIR's Proposed Development Plan:

	<u>Draft EIR Alternative</u>	<u>Final EIR PDP</u>
<u>Residential</u>	180 units	---
<u>Office</u>	400,000 s.f.	500,000 s.f.
<u>Conference/Hotel</u>	500 rooms	350 rooms
<u>Retail</u>	30,000 s.f.	---
<u>R & D</u>	300,000 s.f.	300,000 s.f.

The potential advantages and disadvantages of this approach are similar to those described in Section 2.2.1. above. Some distinctions between these approaches should be noted, however.

First, Massport has conducted a preliminary soils analysis which indicates that in certain portions of both the mixed use and cargo areas of the BIF site, foundation piles of varying depths will have to be utilized to support buildings having heights of 30 to 40 feet or more. Detailed soils tests will have

to be performed, and depending on the results, building heights and/or footprints may be altered in contrast with those shown in the illustrative site plan presented for the revised PDP in Section 1.2 of Chapter 1. It is conceivable that should such tests significantly alter present analysis of the economics of building heights and footprints and suggest that greater heights are necessary to achieve an economic development, Massport may consider increasing square footages or adjusting the mix among office, conference and other uses.

Second, it has been shown in Chapter 4 of this Report that there are certain locations in the mixed use zone where buildings of heights in excess of 80 feet may produce substantial additional noise mitigation for certain sources of aircraft noise at Logan Airport. Again, depending on economic factors and the shape of market demands at a given point in the future, it may prove appropriate to consider increasing square footages or adjusting the mix among office, conference and other uses in order to facilitate further aircraft noise mitigation.

Once again, if increased parking were required to support any such adjustments in composition or density of the mixed use, the traffic implications would be an important factor for investigation in the further environmental reviews which would accompany such a change.

2.3. Diagonal Design Variant for Cargo/Aircraft Element of PDP

Certain commentators on the FEIR have urged Massport to consider a design variant on the alignment of buildings for the

cargo element of the proposed development which we have called a "diagonal" scheme. As discussed in the FEIR, this variation might take one of several forms, but generally involves rotation of the main cargo building (shown in an east-west configuration in the site plan for the PDP in the FEIR) to a northeast-southwest orientation parallel to the Runway 27 safety overrun.

This alignment would accommodate four prime cargo aircraft positions in a diagonal building but would require construction of additional apron positions on an east/west alignment at the easterly half of the cargo area in order to provide an equivalent number of positions to the FEIR Proposed Development Plan. If a decision were made to locate GA on BIF, employment of a diagonal scheme would not allow for development of a more than minimal general aviation apron in the vicinity of the airport fire station. There might then be a tendency to put a general aviation hangar and additional apron facilities closer to the community in the vicinity of the two nearest air cargo aprons which are shown in the illustrative site plan at Figure 3.

The potential advantages and disadvantages of the diagonal variant which we analyzed include:

Advantages:

- o The diagonal alignment removes some BIF aircraft operations farther to the east on BIF, and away from noise sensitive residential areas. This could be expected to result in reduced noise impacts from cargo aircraft in the BIF project.

- A diagonal air cargo building would act as an additional, effective visual as well as noise barrier to aircraft operations and resulting noise.
- Operating taxiways to service the main air cargo facility would be further away from residential areas, with consequent reduction in taxi operations noise.

Disadvantages:

- The diagonal alignment reduces and separates aircraft apron areas available for general aviation and itinerant freighter use resulting in less capacity and reduced efficiency.
- The diagonal alignment necessitates an estimated 24% longer access road, adding to project cost.
- The diagonal alignment could require a near doubling of the primary fuel pipeline to provide the same service as the revised PDP, adding an estimated 75% to the projected fuel pipeline costs.
- The diagonal alignment presents various operational difficulties in comparison with the revised PDP. G.A. operations would be more costly and less efficient due to the physical separation mentioned above. Also, fewer G.A. aircraft could be parked on the irregular shaped parcels which would be created. Finally, large aircraft parked on the diagonal apron would have to be pushed back into a single two-way taxiway upon departure, blocking the taxiway to

inbound and outbound traffic. In contrast, the revised PDP allows all large aircraft to be pushed back onto a dual taxiway causing less potential congestion and delay.

Based on this analysis, Massport believes that the diagonal alignment is not preferable to cargo area building alignments embodied in the Proposed Development Plan. Among other reasons is that a larger number of GA operations may take place in the western portion of the area shown as Air Cargo Area I on the PDP Illustrative Site Plan (Figure 3), which could be more annoying than the fewer cargo aircraft operations in that area foreseen under the PDP.

CHAPTER 3 - AFFECTED ENVIRONMENT

In order to fully assess the environmental implications of the choice among alternatives for BIF development -- including, specifically, whether to proceed with mixed use development in contrast with an exclusively cargo and aircraft related program with attendant construction of a passive wall -- it is necessary to review certain details regarding the affected environment in the East Boston community and especially in the Jeffries Point neighborhood of East Boston. This discussion includes certain historical information which is essential to provide an accurate description of the environment affected by the proposed development of Bird Island Flats.

3.1. Affected Neighborhood: Jeffries Point

East Boston is a relatively isolated section of the City of Boston. Connected to the rest of the City by tunnels and overwhelmed by the siting of the major hub airport for New England, this neighborhood has nonetheless maintained itself as a stable, closely-knit community. This stability has been maintained over decades despite East Boston's lower than average family income levels, suggesting a strong commitment on the part of its residents to maintaining the character of this neighborhood.

Airport impacts are intensely felt in a number of East Boston's neighborhoods:

- ° Neptune Road, Orient Heights and Bayswater, by aircraft overflight;
- ° Jeffries Point by land takings, aircraft noise, truck traffic, and auto traffic.

It is the Jeffries Point neighborhood that is most directly impacted by the proposed Bird Island Flats development. This is not to suggest that impacts on other neighborhoods of East Boston or other communities in the Boston region are not felt. There is, nonetheless, a particular set of historic factors which merits understanding in order to put in appropriate perspective the issues of affected environment in the community most directly impacted by BIF build alternatives.

Jeffries Point, at the southern end of East Boston, is separated from Logan Airport only by a small inlet of Boston Harbor, not incorporated into the Bird Island Flats fill project. The latter program, a massive endeavor to fill nearly 235 acres of Boston Harbor for Logan Airport development, commenced in 1959 and was completed in 1972. The Jeffries Point section is one of the oldest and most densely settled areas in the Boston area, and preexisted both Logan's expansion in general and the fill of BIF in particular.

Bird Island Flats is within sight and sound of many homes in this neighborhood and that visual and noise connection is a constant reminder of the impacts of the airport on residents'

daily lives. Moreover, Jeffries Point is bounded on three sides by Logan Airport and by other Massport facilities. Residents' long-standing concerns regarding Massport's potential acquisition of their neighborhood can only be understood in the context of historical events which took place during the decade from 1965-1975.

3.2. History of Port Authority Encroachment into Jeffries Point

One of the first tangible indications that the Jeffries Point neighborhood would be subjected to encroachment by Logan Airport appeared when the Port Authority developed Amerina Field, one of Jeffries Point's earliest major open spaces, as a postal facility for the Airport. Over the protestations of Jeffries Point residents that another location would be more suitable, the Post Office was located there in 1967 and the neighborhood lost what had once served as a significant recreational resource.

During the period from 1967-1971 the Port Authority also purchased residential properties in Jeffries Point. The Port Authority maintained that it was helping individual residents by this practice especially in light of aircraft noise impacts on nearby residences. Moreover, the location of homes in relation to the airport was widely viewed as reducing the value of Jeffries Point residential property, which, in turn, attracted some residents to sell their homes to the Port Authority which maintained that it was offering the best price for these homes.

However, the effect of the sales of homes to the Port Authority which did occur was to increase Massport's control of

Jeffries Point land. Longtime residents felt that the policy of purchasing residential property in Jeffries Point represented an effort overtime by Massport to clear their neighborhood of residents altogether. Since many of the home purchased by the Port Authority were subsequently demolished, that fear was repeatedly reinforced.

Other Massport actions increased neighborhood concerns. Massport operated a maritime facility on Pier 1 on the western boundary of Jeffries Point. Massport studies conducted in the period 1971-1975 recommended that the agency concentrate its major seaport container operations in East Boston through expansion of the Pier 1 facility. At the eastern end of the community, the Bird Island Fill project was also well underway. Sandwiched in between, a large area of the Jeffries Point neighborhood was incrementally incorporated into Massport's ownership. Massport officials during this period made several public statements regarding Authority plans for an integrated seaport/airport cargo operation extending from Pier 1 to Bird Island Flats. When Massport opposed the building of elderly housing on a site at Maverick Square, citing a goal of keeping the area undeveloped because of aviation noise impacts, residents' suspicions were further heightened.

Jeffries Point's history of resistance to Massport expansion was vividly demonstrated in events relating to the Bird Island Fill project. During the late nineteen-sixties, over 600 trucks a day used Maverick Street on their way to and from the airport. Loaded with fill for airport expansion, they disrupted

neighborhood activity and posed a serious danger to young children who lived and played there. A neighborhood request for a truck haul road on airport property was refused.

Having no other apparent recourse at the time, residents of the area organized a major demonstration in September, 1968. Blockading the street with baby carriages, mothers and children themselves on the truck route and stopped the trucks from passing through for a week. The impasse was finally resolved when Massport yielded to the request of then Governor John Volpe that the Authority build a truck haul route parallel to Maverick Street. However, this entire episode was read by the neighborhood as further harassment by Massport to rid Jeffries Point of its residents.

It is thus no surprise that Jeffries Point residents are on record in opposition to many proposals for Bird Island Flats development. Specifically during this earlier period, they objected to construction of the outer taxiway along Jeffries Point Cove which brought aircraft operations closer to their neighborhood and to the removal of a hangar which provided some sound barrier benefits.

In the early nineteen-seventies, Massport began to plan in earnest for the use of the newly created Bird Island Flats area. The agency proposed the extension of two existing runways, introduction of a new STOL runway, and a new air cargo and taxiway development. This proposed development became the subject of a prolonged battle over environmental impact which

ultimately ended with a court injunction against further work on the project. This judicial determination is described further in Section 2.4.5 of the FEIR which deals with Massport's position concerning the earlier proposed Runway 14-32.

3.3. Massport Program - 1975 to Present

This history of conflict between the Port Authority and the Jeffries Point neighborhood describes a period when attempts were rarely made to deal effectively with the impacts of a major hub airport on its immediate neighbors. When the runway project was stopped by invoking the powers available under the then newly enacted Massachusetts Environmental Policy Act, it underscored that a practice of disregarding the negative, even if unintended consequences, of airport programs would not be acceptable.

In 1976 Massport published a Master Plan establishing policies for Logan's future development. Included are ten policy statements which directly address the long-standing problems faced by Jeffries Point residents and which committed the Port Authority to implement these policies. A five-year program of action which responded to long-standing grievances was outlined. The proposed Bird Island Flats mixed use development is the latest in a series of initiatives by the Port Authority to reinforce its affirmative commitment to enhancing the stability of the Jeffries Point neighborhood.

The five-year action program includes:

1. Definition of airport boundaries and facilities.
2. Divestiture of Massport owned residential and recreational property in Jeffries Point.

3. Adoption of aircraft noise regulations and policies.
4. Relocation of airport related businesses which negatively impact the neighborhood.
5. Identification of employment and development projects which can directly benefit Logan Airport's neighbors and reduce the operational and visual intrusion of the airport on those neighbors.

Each of these elements and its relation to Massport's Proposed Development Plan for BIF is outlined below.

1. Airport Boundaries

The Port Authority has defined the extent of its boundaries and its proposed development areas as shown on Figure 1. By taking this position, the Authority has acted to eliminate concern over continuing physical encroachment into adjacent neighborhoods.

In this connection, the Port Authority took a related step of resolving the Bird Island Flats runway project controversy by committing to the completion of extended safety areas for Runways 9/27 and 4L/22R and the abandonment of the construction of the earlier proposed 14/32 STOL Runway. This strategy was further reinforced in the court injunction mentioned above. In so doing, it also laid the groundwork for the Bird Island Flats development project under review here.

2. Property Divestiture

To implement its commitment to use and develop only those areas within the defined airport boundary, Massport undertook a program over a four-year period to return to local control and

ownership those residential and recreational properties purchased earlier. The Jeffries Point Yacht Club, Tringali Pier, and other Jeffries Point Cove waterfront properties were divested. When combined with the adjacent 4-acre Porzio Park already in public ownership, this divestiture restored the large majority of eastern waterfront boundary to local use and control. The more than twenty residential properties, vacant lots and homes which were acquired in the earlier period described above were also sold to abutters and tenants, wherever possible.

3. Noise Regulations and Policies

In 1977, following extensive studies and investigation into appropriate means for reducing the noise impacts of its aircraft operations at Logan Airport, the Port Authority adopted noise regulations and policies affecting all aspects of operations. These actions included regulations for reducing overall noise levels generated by aircraft. They also included minimizing noise impacts through the construction of noise barriers and the creation of buffer areas. The FAA, in its guidelines for airport development, encourages the provision of buffer areas wherever possible for safety as well as for noise relief. For older airports, built in congested areas, buffer zones necessarily take on different characteristics than those for newer, remote airports. Few opportunities exist at Logan where noise buffering development can be accommodated or where a transition zone between aircraft and airfield activities and the community can be established. Bird Island Flats is one of them.

4. Relocation of Nuisances

The Jeffries Point neighborhood housed a number of off-airport car-rental facilities which interfered with traffic flow and the residential character of the neighborhood. The nature of that business imposed a traffic and parking problem and presented a general nuisance. Working with the neighborhood, the City of Boston and several airlines, Massport acted to bring at least some of these operations onto the airport. This was another step towards the positive use of the Authority's leverage and resources to bring airport-dependent business within airport boundaries whenever feasible and appropriate. It also serves to reinforce the meaning of a clearly articulated airport boundary line.

5. Employment and Development

Aircraft noise can be regulated and abated but not eliminated. Encroachment can be foreclosed by drawing boundary lines, but the size and scale of ever-visible and frequently heard aircraft operations can still be increased. Massport's immediate challenge is to find new solutions and approaches to mitigating the operational and visual impacts of Logan Airport on nearby communities.

The mixed-use development proposal for Bird Island Flats is another response to that challenge. By introducing a commercial transition zone at the periphery of an aircraft operational area, the airport is well served, as is Jeffries Point. The

introduction of a mixed use area accomplishes a number of desirable objectives. To summarize, the development:

1. Reinforces the sense of boundary by assigning airport operations to the interior of the site,
2. Creates an appropriate transition between airport operations and land uses more compatible with neighborhood activities,
3. Offers noise relief in a tangible and potentially economically productive way,
4. Introduces visual relief from the otherwise expansive and residentially inappropriate scale of airport facilities; and
5. Offers potential economic and employment benefits for local residents as well as the region as a whole.

These benefits are further described in other chapters of this Report. In closing, it should be noted that the concept of mixed use development has been endorsed by community representatives as a far preferable response to the problems of major aircraft noise intrusion in their neighborhoods, and that, historically, the community has strongly and consistently rejected the notion of a possible barrier wall as a suitable means of dealing with the issue.

CHAPTER 4: ENVIRONMENTAL IMPACTS

The FEIR contains a comprehensive examination of the environmental impacts, both long and short term, of the Proposed Development Plan, and various alternative BIF plans.

During the review and comment period, questions were raised by MEPA staff and other commentators as to sufficiency, organization and interpretation of the impact assessment contained in the FEIR. Massport subsequently undertook to provide additional clarifying information on the impacts of the Proposed Development Plan, especially the traffic impacts associated with commercial development on BIF. Moreover, since that time, Massport has evaluated still additional measures to mitigate the potential adverse effects of both the FEIR PDP and the revised PDP described in this report. The conclusions derived from the additional studies undertaken by Massport during this period are reported below.

4.1 Noise Impacts

4.1.1. Explanation of Noise Descriptors Used in FEIR

Several requests were received during the review and comment period for a thorough explanation of the various noise descriptors or noise metrics used in the analysis of noise impact

of the PDP in the FEIR. Basically three types of measurement were recorded:

- Maximum (or very short-term) A-weighted sound levels ("peak dBA");
- Percentage (A-weighted) levels ("L10" or "L50" or "L90") and
- Equivalent (energy average A-weighted) levels ("Leq" or "Ldn")

Each type of descriptor is defined, some common uses are given, and some of the strengths and weaknesses of its use are discussed below.

Maximum A-Weighted Levels

The maximum A-weighted level for a given "noise event" is simply the maximum level that would be read by a calibrated standard sound level meter (with A-weighting electronic network) during the course of the event. Maximum levels, consequently, are very easy to measure, and it is fairly easy to develop an intuitive "feel" for how loud an event is, based on its maximum A-weighted level.

Maximum A-weighted levels have been used to quantify the noise of a single type of noise event - e.g., a motor vehicle passby. (Note that distance from the noise source to the measurement point must always be specified.) Combined with a knowledge of the level of the "background" noise, one can roughly

estimate whether or not the event will be detectable. Maximum A-weighted levels are also used to develop mathematical models for computing the A-weighted levels that will be produced by operation of a noise source. For example, the maximum A-weighted sound levels measured at 50 ft. (emission levels) were used to help model the noise produced by taxiing aircraft at Logan.

The main weakness of the maximum A-weighted sound level is that by itself it cannot tell us much about how people will judge a noise environment. We need to know how often the maximums occur, and, at least implicitly, we must know the general time history of the noise: i.e., whether it is a very short duration noise, or a noise level rising relatively slowly to the maximum and dropping back again.

Percentage Levels

These are the descriptors that identify A-weighted levels that are exceeded for a specified percentage of the time during a stated period. Common percentage levels are the 10% (abbreviated L_{10}), 50% (L_{50}), and 90% (L_{90}) levels for a one-hour period. The L_{10} value for a given noise source is the sound level that is exceeded for 10% of the time (usually an hour), the L_{50} is the level exceeded for 50% of the time, the L_{90} is the level exceeded 90% of the time.

In the past, these percentage levels have been used to describe community noise environments, and to predict future, highway traffic produced, noise levels. The L_{10} level, especially, has been used for study of highway noise levels.

Lately, however, these descriptors are used less frequently in noise analysis, and energy average or equivalent levels are preferred. This preference is probably due to three factors: the percentage levels are more difficult to predict than are the equivalent levels; many measuring instruments are now available to measure equivalent levels; and equivalent levels have been found to correlate with community response to noise as well as, if not better than, the percentage levels.

One significant weakness of the percentage level is that it is difficult to predict. Accurate prediction requires the use of very complex mathematical models. Not only are such models difficult to develop, but they are so complicated that it is very difficult to acquire an intuitive "feel" for the results, to know what changes in noise level will result from given changes in noise source operation. For example, a doubling of the number of noise events (e.g., number of departures per hour) does not necessarily result in a 3 dB increase in L_{10} .

Equivalent Levels

The equivalent level of a noise source is the A-weighted sound level that accounts for all sound energy produced by that source. The equivalent sound level during a stated time period for a given noise source is the level of a steady sound that has the same sound energy as does the actual time-varying sound produced by that noise source.

The equivalent level may be used to describe sound levels for any specified period of time. Currently, three basic equivalent

levels are used: the hourly equivalent sound level (L_{eq}); the 24-hour equivalent sound level (L_{eq}); and the day-night average sound level (L_{dn}). The 24 hour equivalent level and day-night average sound level both apply to a specified 24-hour period, and the day-night average sound level contains a 10 dB penalty for nighttime (generally 10pm to 7am) noises.

Equivalent levels now seem to be used for most transportation noise problems. Relative ease of computation, documented relationship with community response, and relative ease of measurement all tend to make equivalent levels the preferred type of descriptor. A short-coming of the equivalent level is that for some noise problems, the lay public seems to have difficulty relating personal experiences with noise levels to the equivalent, energy average sound level. For noise sources that produce very high sound levels of relatively short duration, the equivalent sound level is typically considerably lower than the maximum A-weighted sound level produced by the source. Aircraft operations can easily produce maximum A-weighted sound levels in the community of 100 dB or more, but the associated equivalent level (day-night sound level, for example) may not exceed 80 dB. However, even though the public may have difficulty understanding such differences in levels, the fact remains that community response to noise corresponds fairly well with equivalent levels, and equivalent levels can be computed with reasonable reliability.

4.1.2. Further Exploration of the Effectiveness of Noise Barriers in the Buffer Zone

One important mitigating effect of the PDP, as explained in the FEIR, is the opportunity presented by the project to effectively shield, and thereby to reduce the negative impacts of Logan aircraft operations, particularly the operations at the Eastern Airway Passenger terminal by construction of a noise buffer in the transition zone. The transition zone is the area between the proposed air cargo facilities and Jeffries Cove, combination of either (1) a 40 foot high wall or (2) a series of buildings, or a construction of buildings and walls in the same location. Massport's commitment to a noise buffer arose both from historical studies of the U.S. Air/Eastern operations and their effect on nearby residential areas, and from an analysis of the potential noise impacts of the PDP. In light of the apparent preference by Secretary Bewick and others for a passive barrier wall, as opposed to airport-related structures, Massport re-examined the noise impacts of various buffer possibilities following publication of the FEIR. The results are reported below.

The Original Buffer Commitment

The initial analysis of barrier effects grows from Massport's recognition that the siting of 30 to 40 foot high cargo buildings might offer mitigation of aircraft noise on nearby aprons. Earlier indications of the value of barriers had come from studies of noise walls conducted for the Authority (1) in

conjunction with the original construction of outer taxiway in 1973 and (2) in conjunction with the proposal by Eastern Airlines to construct a commuter pier extension to their terminal. Both of these prior studies had been limited to considering walls not higher than 40 feet because of the engineering difficulties involved in constructing higher walls. The original barrier analysis performed for the BIF project built upon those earlier studies and upon a recognition that a 30 to 40 foot high cargo building was acoustically similar to a wall. After the preliminary studies for BIF showed that a mixed use component along the edge of the site was both operationally and financially desirable, this acoustic logic was extended to include the commercial buildings in the transition zone.

The height of the proposed buildings was proposed to be equal to the earliest 40' high walls since lower barriers would not provide the desired acoustic shielding, yet the economics of building development were not sufficiently certain at that time to warrant a commitment to higher buildings. This concept came to be referred to as the "active buffer." After the active buffer concept was established, further design and marketing efforts determined that a financially viable active buffer could be developed at BIF within the site geometry in the outer taxiway area adjacent to Jeffries Point. Although the FEIR commitment by Massport did not distinguish between the active or passive buffer, Massport finds that the active buffer is preferable for financial, environmental, land use planning and a variety of other reasons.

Noise Attenuation Benefits of Higher Buffers

Since the publication of the FEIR, it has been suggested that more noise mitigation could be achieved if higher barriers, either active or passive, were built as part of the PDP. Massport has reviewed the locational possibilities for higher structures with our acoustic consultant, BB&N, who has prepared a review of the performance of 100' high barriers at these locations with respect to aircraft operations occurring on the middle and eastern portions of the air cargo area.

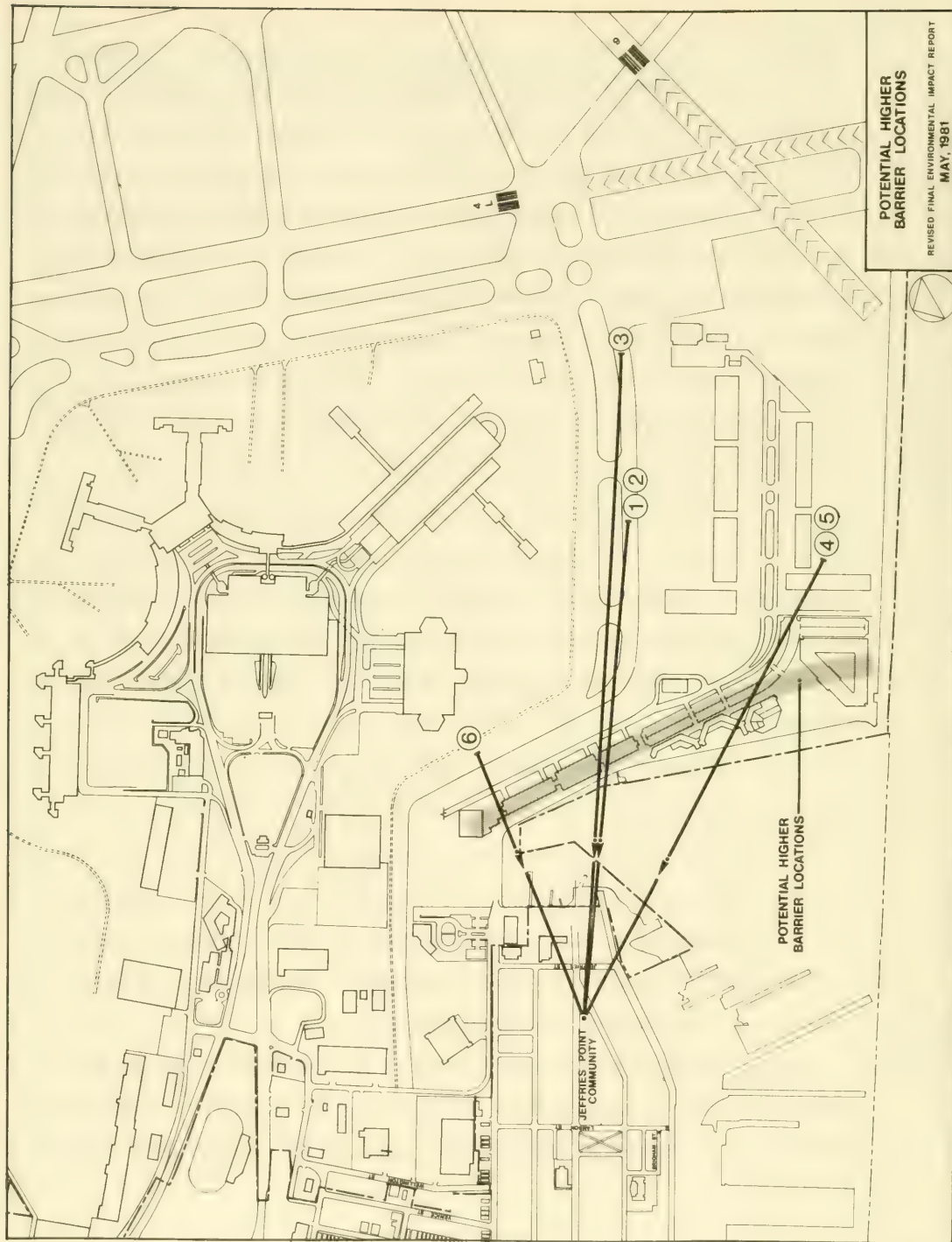
Two principal limitations to acoustic barrier performance should be kept in mind. First, barrier effectiveness decreases as the distance from the barrier to either the noise source or the listener increases. Since the distance to the community from a barrier along the western shore is quite large already, a 40' high barrier along the shore only produces the 7dB attenuation referred to in the FEIR from noise sources within a few hundred feet of the barrier. Second, the performance of any barrier will be reduced at least 5-10dB by steady wind flowing from the aircraft, over the barrier, toward the community. This second effect can be eliminated if the wind flowing in the direction of the community is not smooth (as would exist over flat, unbroken land or water), but is turbulent (as would exist over and around the buildings of the Airport terminal complex). It should also be kept in mind that while there is agreement between the theoretical and the actual measured acoustical benefits of barriers under calm wind conditions, the analytic methods of

applied acoustics are less capable of predicting the reduction in barrier performance caused caused by wind. In spite of these uncertainties, Massport finds that the presence of large terminal buildings upwind of the Eastern and US Air aprons indicates that turbulent conditions would apply along the path to the barrier and to the community, and that barrier performance would therefore not be reduced significantly for those aprons. However, for the line from cargo aprons on BIF to potential barrier locations and on into the community, smooth, non-turbulent wind conditions are expected* to degrade barrier performance in this part of the project area.

In order to estimate the magnitude of these wind effects, BB&N undertook an analysis to determine the wind velocity which would just negate the expected attenuation of various height barriers at various locations on the BIF site. This analysis is presented in full in Appendix A-4, but can be summarized as follows:

- ° virtually any wind will negate the effects of unprotected barriers up to 130 feet high at, for example, locations 2 or 3 shown on Figure 4.
- ° The effectiveness of barriers in protected locations, such as downwind of the Eastern and USAir terminals (see location 6 on Figure 4) will be unaffected by wind effects.

In an attempt to demonstrate the maximum possible effect of higher barriers under more favorable conditions than those considered by BB&N, Massport undertook another assessment of the



POTENTIAL HIGHER
BARRIER LOCATIONS

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effect of higher barriers upon noise generated at various air cargo apron positions further away from the community. This analysis accounts for the reduction in noise levels due to the greater distance from the community and assumes a minimal reduction in barrier effectiveness of 5dB due to wind effects. The principals conclusions are-*/:

Location 1. For cargo aircraft operations on outer taxiway in the vicinity of the middle of the main cargo area, the 40' high shoreline barrier is likely to offer no potential reduction in noise levels in the community.

Location 2. For that same aircraft location, 100 foot high shoreline barriers would offer a reduction of about 4dB in terms of its contribution to Leq. (The contribution from this source is about 10dB less than the Eastern/USAir contribution because of the greater distance from the community.)

Location 3. For aircraft operations farther to the east (in the vicinity of the Airport fire station) a 100 foot high barrier would be less effective, with about 3dB reduction applied to the Leq contribution from the southern location. (This contribution is about 13dB less than the Eastern/USAir contribution to Leq., again due to the greater distance from the community.)

Location 4. For aircraft operations at the Air Cargo II apron closest to the community, the adjacent cargo building

-*/ For illustration of locations discussed below, see Figure 4.

should provide about 3dB of attenuation applied to an Leq contribution (which is about 9dB less than the Eastern/US Air Levels.)

Location 5. For this same location, a 100 foot high barrier in the transition zone would provide about 7dB reduction to the Leq contribution.

Location 6. For aircraft operations in the areas which were originally considered as candidates for attenuation by buffers, namely the taxiways and aprons closer to Jeffries Point, a 100 foot high barrier would have the advantage of calm wind conditions and could be expected to reduce the Leq contribution of the loudest ground noise heard in the community by as much as 10 to 20dB.

Although this assessment does not fully account for the reduction in barrier attenuation due to wind effects documented by BB&N, it supports the conclusion that the use of higher barriers to attenuate noise generated further to the east on BIF (for Locations 2, 3 or 5, for example) does not appear to be promising. However, higher barriers would seem to offer additional benefit in the location for which the original buffer was proposed -- along the western edge of the site in the vicinity of the dual taxiway closest to Jeffries Point (Location 6).

4.2. Air Quality Impacts

This section addresses three issues. First, it clarifies the air quality discussion included in the FEIR, responding to

questions and misunderstandings of commentators on that document, and correcting erroneous truck traffic assumptions which tended to understate the descriptions of likely impacts of the FEIR build alternatives (Section 4.2.1). However, these changes do not affect any conclusions drawn from the FEIR analysis. Second, the discussion presents the results of an analysis of the air quality improvements resulting from the further evolution of the development plan and additional mitigating measures which have been adopted since the filing of the FEIR (Section 4.2.2). Finally, it addresses air quality issues which were raised by the U.S. Environmental Protection Agency (EPA) regarding compliance with the Massachusetts' State Implementation Plan (SIP) (Section 4.2.3). Those issues deal with air quality analysis that went beyond the tasks defined by Massport and concerned state and federal regulatory agencies during the scoping of the EIS/EIR work effort. However, the results are presented here to clarify the air quality effects of the RFEIR PDP.

4.2.1. Clarification of Air Quality Impacts Reported in the FEIR

The estimated air quality impacts of the FEIR development alternatives, including the PDP, were inaccurately stated due to an over-estimate of the total number of truck trips generated in the Revised No-Build case. The traffic levels associated with the build cases are unchanged. Correcting the Revised No-Build predictions lowers their associated impacts, therefore increasing the differential between the No-Build and build cases.

The corrected truck volumes are reported in Appendix A-1,

Errata Sheet - Final EIR/EIS. Briefly, the FEIR analysis of the Revised No-Build case was based on 4,514 entering trucks per day; whereas the correct number should have been 2,375.

Reducing the estimate of truck movements for the Revised No-Build case slightly reduces the carbon monoxide (CO) emissions predicted for that case, but has very little effect on the emissions of hydrocarbons (HC), oxides of nitrogen (NOx) and total suspended particulates (TSP). The following table summarizes the percentage increases in total airport emissions due to the FEIR development alternatives as compared to the correct Revised No-Build emissions.

Table 4.2.1

FEIR Build Alternatives (All with GA on BIF)	% Changes in Total Logan Emissions in Year 2000 as Compared to the Revised No-Build			
	<u>CO</u>	<u>NOx</u>	<u>HC</u>	<u>TSP</u>
High Intensity Cargo	+6.0	+2.7	+1.8	+3.9
Low Intensity Cargo	+6.4	+3.0	+2.1	+4.4
Mixed Use/ High Intensity Cargo	+7.0	+3.0	+2.1	+4.7
FEIR Proposed Development Plan	+6.7	+3.2	+2.6	+5.0

The following discussion provides important clarifying information for each of the four air pollutants considered.

Carbon Monoxide (CO)

The "mixed use" alternative included in the Draft EIR resulted in a CO "hot spot" in the southwest corner of the development site, due to the concentration of traffic associated with the commercial development. This problem was eliminated in the FEIR PDP by locating one-half of the proposed office space farther north in the site. As a result, no exceedances of the 1 hour or 8 hour CO standards were predicted at BIF or the tunnel portals in the year 2000.

This 8 hour CO level at sensitive receptor points was predicted for 1987 for the FEIR and RFEIR PDP. The results are discussed in Section 4.2.3.

Hydrocarbon (HC)

Hydrocarbon emissions are particularly important because of their impact on odors perceived in the community and because of their contribution to ozone formation. It is difficult to estimate the contribution of HC emissions at Logan to either of these problems. Moreover, there are no state or federal standards or criteria for HC levels to which the predicted concentrations can be compared. Therefore, the emphasis in the FEIR was placed on comparing HC emissions for each alternative, as a reasonable way of representing HC impacts.

The important result of the HC analysis is that the most significant future source of HC emissions is fuel storage and handling, an area which offers many opportunities for effective

mitigation. The extensive mitigation to which Massport is committed is described in Chapter 5.

Oxides of Nitrogen (NO_x)

As noted in the FEIR, NO_x levels will probably increase faster than any other air pollutant around the airport because of the increased use of more efficient jet aircraft engines. Although these newer engines produce less HC, CO, and TSP than older engines they are replacing, they emit increased amounts of NO_x.

Several of the commentators on the Final EIR questioned the method used in arriving at the NO_x and, in particular, the NO₂ levels presented in the FEIR. Two basic adjustments were made. First, the model was calibrated by reducing the original NO_x predictions by 55%, because the predicted NO_x concentration for the existing conditions was 120% higher than the observed maximum. Second, NO₂ concentrations were estimated to be 54% of the total NO_x level, which was the maximum NO₂/NO_x ratio observed in Jeffries Point during two monitoring programs performed by our air quality consultant. The 54% also falls within the range observed at other locations around Logan in a monitoring study conducted in the summer of 1979.

Based on NO_x monitoring in these three Logan air quality studies, and modelling of future conditions, neither NO₂ nor NO_x are anticipated to be a short term pollution problem. However, they may become a problem in Jeffries Point in the late 80's and 90's whether or not BIF is developed. Therefore, it is essential

that NOx trends be carefully monitored over the next several years to alert Massport and other officials of developing problems, which are largely independent of BIF development. Chapter 5, Section 5.2.8., describes Massport's commitment to undertake such monitoring.

Total Suspended Particulates (TSP)

The FEIR analysis of TSP reflected the anticipated decrease in TSP emissions due to the use of more efficient aircraft engines. Total predicted airport TSP emissions decline by approximately 28% from existing levels under any of the BIF build alternatives and are only slightly higher than those predicted for the Revised No-Build case. TSP emissions during the construction period are of particular concern. They will be minimized to the maximum feasible extent by the mitigating measures outlined in Chapter 5 of the FEIR.

4.2.2. Air Quality Assessment of RFEIR Program

As explained below in Section 4.4, Traffic Impacts, the RFEIR PDP generates substantially less traffic than the generic FEIR program, and extensive traffic mitigating measures described in Chapter 5 substantially reduce airport-wide traffic levels in the forecast year - 1987. These traffic reductions have considerable

effect on air quality impacts of the PDP, as can be seen in the following table:

Table 4.2.2

FEIR Build Alternatives (all with GA on BIF)	% Changes in Total Logan Emissions in Year 2000 When Compared to the Revised No-Build Contained in FEIR			
	<u>CO</u>	<u>NOx</u>	<u>HC</u>	<u>TSP</u>
High Intensity Cargo	+6.0	+2.7	+1.8	+3.9
FEIR/PDP	+6.7	+3.2	+2.6	+5.0
RFEIR/PDP	+5.4	+2.9	+2.1	+4.2

Tables 4.2.3 through 4.2.6 compare the emissions for the four pollutants, by source, for the RFEIR PDP to four other illustrative cases: Existing Conditions, Revised No-Build, High Intensity Cargo and the FEIR PDP. Figures 5, 6 and 7 show the contraction of the CO, HC and TSP isopleths that will result due to the reduced emissions of the RFEIR PDP (dotted line) compared to the FEIR PDP (solid line). The corresponding NOx isopleth is not shown, because the increment is too small to show up at this scale.

These figures and tables lead to several important conclusions about the air quality impacts of the RFEIR PDP, including:

- o The increase in CO emissions due to the RFEIR PDP in comparison with the Revised No-Build is lower than any other build alternative.

TABLE 4-2-3

TOTAL CARBON MONOXIDE EMISSION (IN KILOGRAMS)
FROM LOGAN AIRPORT AND ITS IMMEDIATE VICINITY FOR
A 24-HOUR PERIOD IN YEAR 2000, BY PROJECT ALTERNATIVE

	CO EXISTING CONDITIONS	REVISED NO-BUILD	HIGH INTENSITY		FEIR PROPOSED DEVELOPMENT PLAN		REVISED PROPOSED DEVELOPMENT PLAN	
			WITH GA	WITHOUT GA	WITH GA	WITHOUT GA	WITH GA	WITHOUT GA
Aircraft								
Air Carriers	5,160	6,390	6,390	6,390	6,390	6,390	6,390	6,390
Commuters	342	394	394	394	394	394	394	394
General Aviation	619	778	685	741	698	741	698	741
Cargo	711	897	1,120	1,110	1,140	1,130	1,140	1,130
Total Aircraft	6,830	8,460	8,590	8,630	8,630	8,630	8,630	8,655
Non-Aircraft								
Services Vehicles	1,210	1,720	1,750	1,750	1,750	1,750	1,750	1,750
Auto Parking/ Terminal/Loop	5,720	4,070	4,210	4,210	4,430	4,430	4,247	4,247
Employee Parking	194	138	138	138	138	138	138	138
Trucks	88	131	703	813	545	545	545	545
Fuel Storage/ Handling	--	--	--	--	--	--	--	--
Total Non-Aircraft	7,210	6,060	6,800	6,910	6,860	6,860	6,680	6,680
Total Airport	14,040	14,520	15,390	15,540	15,490	15,500	15,310	15,335
Surroundings								
C-1	1,980	1,410	1,410	1,410	1,550	1,550	1,550	1,550
Tunnel	10,990	3,440	3,440	3,440	3,850	3,850	3,850	3,850
Total	12,970	4,850	4,850	4,850	5,400	5,400	5,400	5,400
TOTAL	27,010	19,370	20,240	20,390	20,890	20,890	20,710	20,913

TABLE 4.2-4

TOTAL HYDROCARBON EMISSIONS (IN KILOGRAMS)
FROM LOGAN AIRPORT AND ITS IMMEDIATE VICINITY FOR
A 24-HOUR PERIOD IN YEAR 2000, BY PROJECT ALTERNATIVE

Aircraft	HC EXISTING CONDITIONS	REVISED NO-BUILD	HIGH INTENSITY		FEIR PROPOSED DEVELOPMENT PLAN		REVISED PROPOSED DEVELOPMENT PLAN	
			WITH GA	WITHOUT GA	WITH GA	WITHOUT GA	WITH GA	WITHOUT GA
Air Carriers	1,950	1,620.0	1,620.0	1,620.0	1,620.0	1,620.0	1,620.0	1,620.0
Commuters	112	182.0	182.0	182.0	182.0	182.0	182.0	182.0
General Aviation	248	255.0	198.0	228.0	207.0	228.0	228.0	228.0
Cargo	504	221.0	314.0	309.0	326.0	315.0	326.0	313.0
Total Aircraft	2,810	2,280.0	2,310.0	2,330.0	2,340.0	2,350.0	2,340.0	2,350.0
Non-Aircraft								
Services Vehicles	274	382.0	389.0	389.0	389.0	389.0	389.0	389.0
Auto Parking/ Terminal/Loop	596	490.0	508.0	508.0	543.0	543.0	514.0	514.0
Employee Parking	20	16.0	16.0	16.0	16.0	16.0	16.0	16.0
Trucks	9	9.0	49.0	56.0	37.0	37.0	37.0	37.0
Fuel Storage/ Handling	1,790	3,090.0	3,105.0	3,105.0	3,105.0	3,105.0	3,105.0	3,105.0
Total Non-Aircraft	2,699	3,990.0	4,070.0	4,070.0	4,090.0	4,090.0	4,061.0	4,061.0
Total Airport	5,500	6,270.0	6,380.0	6,400.0	6,430.0	6,440.0	6,401.0	6,410.0
Surroundings								
C-1	230	164.0	164.0	164.0	180.0	180.0	180.0	180.0
Tunnel	788	369.8	369.8	369.8	414.8	414.8	415.0	415.0
Total	988	534.0	534.0	534.0	595.0	595.0	595.0	595.0
TOTAL	6,490	6,800.0	6,910.0	6,940.0	7,030.0	7,040.0	6,996.0	7,000.0

TABLE 4.2-5

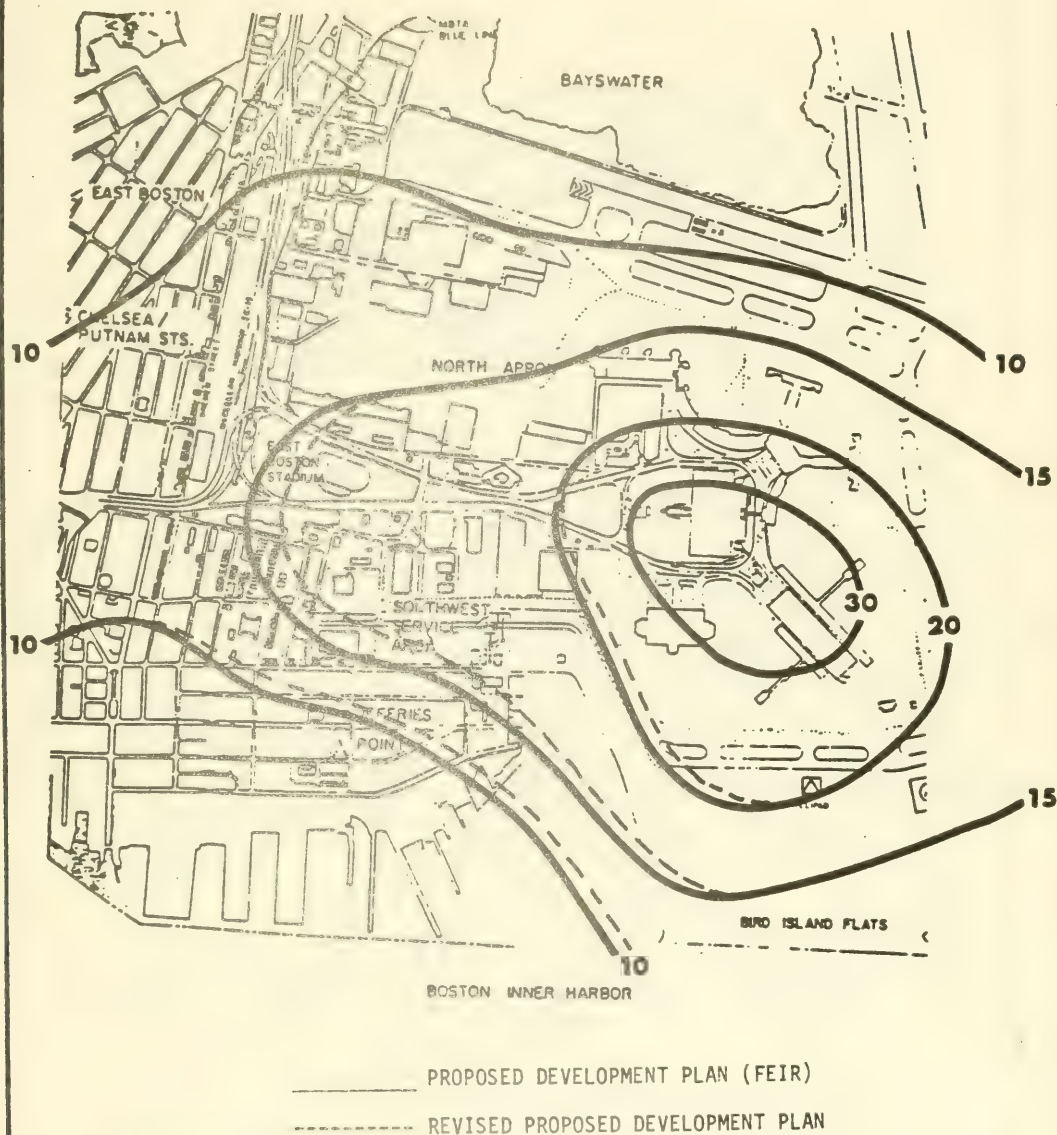
TOTAL OXIDES OF NITROGEN EMISSIONS (IN KILOGRAMS)
FROM LOGAN AIRPORT AND ITS IMMEDIATE VICINITY FOR
A 24-HOUR PERIOD IN YEAR 2000, BY PROJECT ALTERNATIVE

	NOx EXISTING CONDITIONS	REVISED NO-BUILD	HIGH INTENSITY		FEIR PROPOSED DEVELOPMENT PLAN		REVISED PROPOSED DEVELOPMENT PLAN	
			WITH GA	WITHOUT GA	WITH GA	WITHOUT GA	WITH GA	WITHOUT GA
Aircraft								
Air Carriers	3,190	6,700.0	6,700.0	6,700.0	6,700.0	6,700.0	6,700.0	6,700.0
Commuters	65	269.0	269.0	269.0	269.0	269.0	269.0	269.0
General Aviation	51	81.4	78.8	80.6	79.1	80.6	79.1	80.6
Cargo	240	864.0	1,020.0	1,020.0	1,030.0	1,020.0	1,030.0	1,020.0
Total Aircraft	3,580	7,910.0	9,060.0	8,070.0	8,080.0	8,070.0	8,080.0	8,070.0
Non-Aircraft								
Services Vehicles	123	98.0	100.0	100.0	100.0	100.0	100.0	100.0
Auto Parking/ Terminal/Loop	310	385.0	404.0	404.0	439.0	439.0	410.0	410.0
Employee Parking	14	18.0	18.0	18.0	18.0	18.0	18.0	18.0
Trucks	7	12.0	63.0	73.0	49.0	49.0	49.0	49.0
Fuel Storage/ Handling	--	--	--	--	--	--	--	--
Total Non-Aircraft	454	513.0	585.0	595.0	606.0	606.0	577.0	577.0
Total Airport	4,030	8,420.0	8,650.0	8,670.0	8,690.0	8,680.0	8,657.0	8,647.0
Surroundings								
C-1	140	174.0	174.0	174.0	185.0	185.0	185.0	185.0
Tunnel	129	278.8	278.8	278.8	312.7	312.7	313.0	313.0
Total	269	453.0	453.0	453.0	498.0	498.0	498.0	498.0
TOTAL	4,300	8,880.0	9,100.0	9,120.0	9,188.0	9,170.0	9,155.0	9,145.0

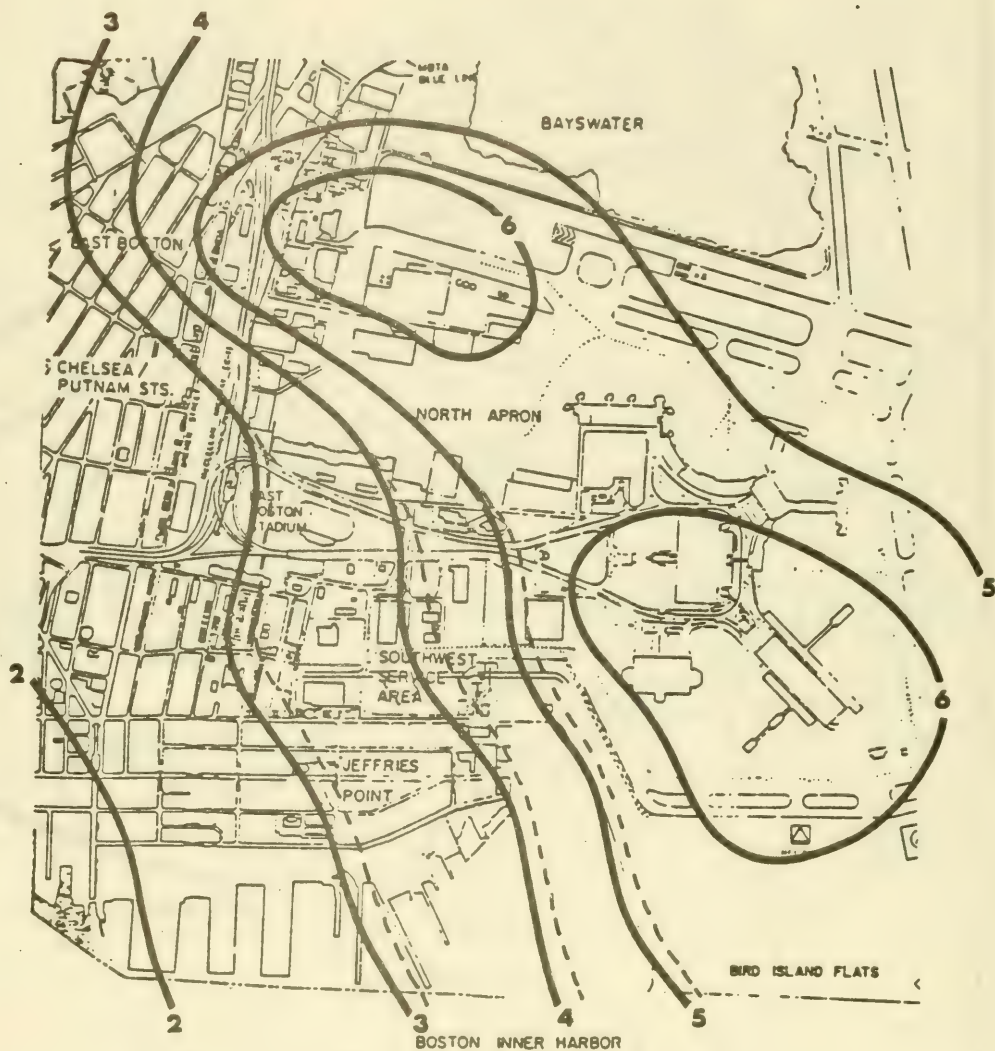
TABLE 4.2-6

TOTAL TSP (IN KILOGRAMS)
FROM LOGAN AIRPORT AND ITS IMMEDIATE VICINITY FOR
A 24-HOUR PERIOD IN YEAR 2000, BY PROJECT ALTERNATIVE

Total Suspended TSP-Particulates	EXISTING CONDITIONS	REVISED NO-BUILD	HIGH INTENSITY		FEIR PROPOSED DEVELOPMENT PLAN		REVISED PROPOSED DEVELOPMENT PLAN	
			WITH GA	WITHOUT GA	WITH GA	WITHOUT GA	WITH GA	WITHOUT GA
Aircraft								
Air Carriers	450	236.0	236.0	236.0	236.0	236.0	236.0	236.0
Commuters	9	27.9	27.9	27.9	27.9	27.9	27.9	27.9
General Aviation	3	6.4	6.1	6.1	6.1	6.1	6.1	6.1
Cargo	22	39.3	39.0	27.6	39.6	39.6	39.6	39.6
Total Aircraft	485	301.0	309.0	308.0	310.0	309.0	310.0	309.0
Non-Aircraft								
Services Vehicles	6	8.6	8.7	8.7	8.7	8.7	8.7	8.7
Auto Parking/ Terminal/Loop	31	43.3	44.0	44.8	48.1	48.1	45.4	45.4
Employee Parking	1	5.3	5.3	5.3	5.3	5.3	5.3	5.3
Trucks	1	1.6	6.4	7.8	6.1	6.1	6.1	6.1
Fuel Storage/ Handling	--	--	--	--	--	--	--	--
Total Non-Aircraft	39	58.8	65.2	66.6	68.2	68.2	65.5	65.5
Total Airport	523	360.0	374.0	375.0	378.0	378.0	375.0	375.0
Surroundings								
C-1	16	22.0	22.0	22.0	24.1	24.1	24.1	24.1
Tunnel	--	--	--	--	--	--	--	--
Total	16	22.0	22.0	22.0	24.1	24.1	24.1	24.1
TOTAL	539	382.0	396.0	397.0	402.0	401.0	399.0	399.0



ESTIMATED MAXIMUM 1-HOUR CARBON MONOXIDE CONCENTRATIONS (IN mg/m^3) FOR THE PROPOSED DEVELOPMENT PLAN (FEIR) AND REVISED PROPOSED DEVELOPMENT PLAN (WITH GA IN THE YEAR 2000).

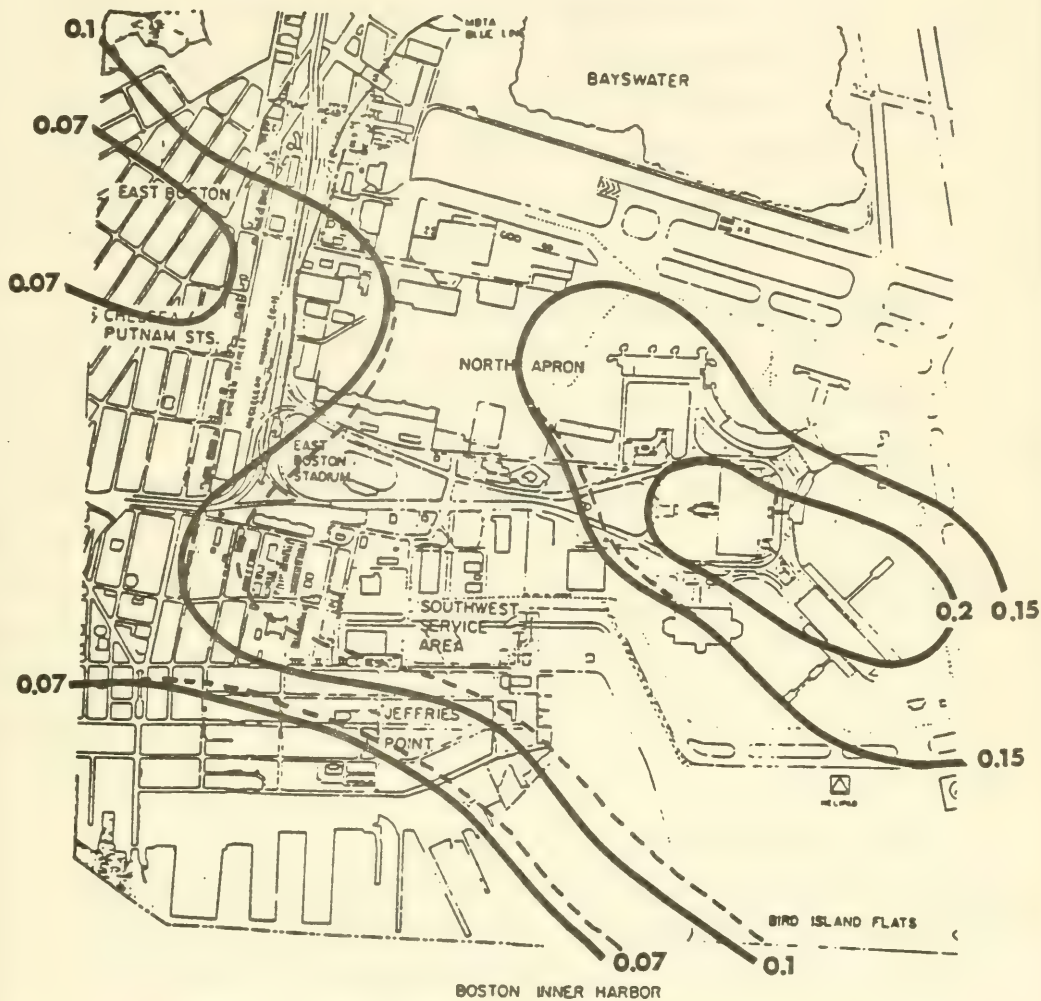


———— PROPOSED DEVELOPMENT PLAN (FEIR)

----- REVISED PROPOSED DEVELOPMENT PLAN

ESTIMATED MAXIMUM 1-HOUR TOTAL HYDROCARBON CONCENTRATIONS (IN mg/m^3) FOR THE PROPOSED DEVELOPMENT PLAN (FEIR) AND REVISED PROPOSED DEVELOPMENT PLAN (WITH GA IN THE YEAR 2000).

FIGURE 6



———— PROPOSED DEVELOPMENT PLAN (FEIR)
 ----- REVISED PROPOSED DEVELOPMENT PLAN

ESTIMATED MAXIMUM 24-HOUR TOTAL SUSPENDED PARTICULATES CONCENTRATIONS (IN mg/m^3) FOR THE PROPOSED DEVELOPMENT PLAN (FEIR) AND REVISED PROPOSED DEVELOPMENT PLAN (WITH GA IN THE YEAR 2000)

- The increase in HC emissions due to the RFEIR PDP is among the lowest of any of the build alternatives.
- The increases in NO_x and TSP emissions due to the RFEIR PDP are slightly less than those due to the FEIR PDP.

4.2.3. Compliance With Mass. SIP

At the close of the comment period on the Final Environmental Impact Statement/Impact Report, the U.S. Environmental Protection Agency (EPA) raised certain concerns regarding the effect of BIF development on compliance in the Boston region with the Massachusetts' State Implementation Plan (SIP) for achieving the goals of the Federal Clean Air Act. In particular, questions were posed as to the potential effect, if any, of BIF development on the maximum eight hour CO concentration for several locations in 1987, the "attainment year" for federal air quality standards.

1987 Maximum Eight Hour CO Analysis

In the Final EIR, 1 hour CO levels were calculated for 1982, 1987 and 1993. Massport has now estimated 1987 8 hour CO levels for all receptor points included in the FEIR and for the Havre Street location suggested by the EPA (because it is somewhat nearer the tunnel portal than the Gove Street receptor used in the FEIR.) Four sensitive receptors which demonstrate the results are discussed below, including the receptors at Havre and Gove Streets, one at the Airport Hilton Hotel entrance and one at the public tennis courts adjacent to the airport crossroad.

Havre Street Receptor

The peak 1987 8 hour CO levels experienced at the Havre Street location are primarily related to Central Artery congestion, not Sumner Tunnel traffic, as might be expected. This relationship is due to the fact that the Sumner Tunnel traffic demand is not predicted to exceed capacity in 1987, even with BIF development, as discussed in Section 4.4.

Therefore, the CO analysis was conducted for three Artery conditions:

Table 4.2.7
Havre Street Receptor
1987 - 8hr CO Levels - (noon to 8 p.m.)
(in mg/m³)

<u>Traffic Conditions</u>	<u>Existing</u>	<u>Revised No-Build</u>	<u>FEIR PDP</u>	<u>RFEIR PDP</u>
"Free Flow" Traffic (no congestion on Central Artery)*	7.8	4.7	5.4	5.3
Congested Conditions from 3 to 7 p.m.*	13.7	8.3	10.3	9.5
Congested Conditions from 3 to 8 p.m.	15.4	9.3	11.8	10.7

* The "Free Flow" condition and "Congested" condition (3 to 8 p.m.) are based on actual observations of tunnel queuing on 3/12/81 and 3/20/81, respectively. These were adjusted to 1987 traffic levels including the anticipated increment from development at BIF.

** The "Congested" condition (3 to 7 p.m.) reflects conditions on a typical congested day when traffic queues at the tunnel disperse after 7:00 p.m. This case was also adjusted for 1987 traffic volumes and increments from BIF development.

As shown in this table, the RFEIR PDP is predicted to result in a violation of the $10\text{mg}/\text{m}^3$ 8 hour CO standard at Havre Street in 1987 under unusual traffic conditions, when the Central artery congestion continues until at least 8 p.m. This small exceedance ($0.7\text{ mg}/\text{m}^3$) is believed to be insignificant and to be within the uncertainty in the modeling input data and related modeling sensitivity. Under less extreme traffic conditions, no violation is anticipated. Moreover, the RFEIR PDP is predicted to result in 1987 8 hour CO levels substantially under both existing levels and the levels that would result from the FEIR PDP, under all traffic conditions.

Gove Street Receptor

Estimates of 8 hour CO levels were also predicted for Gove Street, as shown in Table 4.2.8.

Table 4.2.8

Gove Street Receptor
1987 - 8 Hour CO Levels at Summer Tunnel - (noon to 8 p.m.)
 (in mg/m^3)

Traffic Conditions	Existing	Revised No-Build	FEIR PDP	RFEIR PDP
"Free Flow"	7.0	4.2	4.5	4.3
Congested Conditions 3 to 7 p.m.	8.5	5.1	6.7	6.1
Congested Conditions 3 to 8 p.m.	8.8	5.3	7.4	6.4

At this receptor, the RFEIR PDP does not result in any violation of the 8 hour CO standard. It also results in a substantial improvement over existing conditions and the FEIR PDP estimates.

Hilton Receptor

Eight hour CO levels at the entrance to the Airport Hilton were estimated for the same three Central Artery traffic conditions as Gove and Havre Streets, because congestion on the airport outbound road is also related to Central Artery performance. The results of the analysis for the Hilton location are summarized in Table 4.2.9.

Table 4.2.9

Hilton Hotel Receptor
1987-8hr CO Levels - (noon to 8 p.m.)
(in mg/m³)

<u>Traffic Conditions</u>	<u>Existing</u>	<u>Revised No-Build</u>	<u>FEIR PDP</u>	<u>RFEIR PDP</u>
"Free Flow"	15.6	11.1	10.8	10.5
Congested Conditions 3 to 7 p.m.	16.2	11.4	11.5	11.1
Congested Conditions 3 to 8 p.m.	16.4	11.5	11.7	11.2

As the table shows, there will be an 8 hour CO violation at the Hilton with or without BIF development. BIF development, with mitigating measures (including the roadway improvements described in Chapter 5) will reduce this violation slightly. Also, the RFEIR PDP will result in substantially lower CO levels than currently exist, and slightly lower levels than the FEIR PDP.

The low capital roadway improvement program to which Massport is committed as a mitigating measure for this project is the

major source of improvement in CO levels at the Hilton, because it will decongest the crossroad intersection substantially. However, it will also increase somewhat the volume of traffic passing in front of the Hilton on the outbound road, thereby slightly reducing the extent of improvement.

Tennis Court Receptor

A receptor was also located at the public tennis courts adjacent to the airport crossroad. As shown in Table 4.2.10, a violation of the 8 hour standard is also predicted for this location. However, the RFEIR PDP, with its associated mitigating measures, results in substantially lower CO levels than the existing conditions, and slightly higher than the Revised No-Build and lower than the FEIR PDP.

Table 4.2.10
Tennis Court Receptor
1987-8hr CO Levels - (noon to 8 p.m.)
(in mg/m³)

Traffic Conditions	Existing	Revised No-Build	FEIR PDP	Revised PDP
"Free Flow"	14.0	10.1	10.7	10.5
Congested Conditions 3 to 7 p.m.	14.0	10.1	10.7	10.5
Congested Conditions 3 to 8 p.m.	14.0	10.1	10.7	10.5

Hydrocarbon Emissions

The EPA also questioned Massport's intentions to minimize hydrocarbon emissions. Chapter 5 describes the steps Massport

will take in this area, primarily through vapor controls on fuel storage facilities.

The magnitude of the increase in hydrocarbon emissions is very easy to correct. The net increase in emissions over the Revised No-Build case, due to the RFEIR PDP, is estimated to be approximately 130 kilograms (Kg) per day. This represents less than 5% of the total estimated fuel storage and handling related losses. Hence, installation of vapor controls at only some of the fuel farm facilities (which recover 80 to 90% of the losses) would reduce HC emissions and more than compensate for the increase resulting from the RFEIR development.

4.3 Water Quality Impacts

The impacts to water quality from the Proposed Development Plan, and the other BIF alternatives are set forth in the FEIR. Because BIF is a filled land site located adjacent to Boston Harbor, Massport's BIF development is subject to review under the Commonwealth's Wetlands Protection statute (Massachusetts General Laws Chapter 131, sec. 40.) During a public hearing, (held after publication of the FEIR/EIS) and during staff discussions between the Boston Conservation Commission and Massport, concerns were focused on the impacts to Boston Harbor water quality due to stormwater runoff from Bird Island Flats, and the potential harmful effects of oil spills if drainage from the project area was not controlled. Water quality impacts associated with the Proposed Development Plan discussed in the Final EIR/EIS were principally those attributable to stormwater runoff. Stormwater

runoff generated at the site was not predicted to contribute to exceedances of water quality standards and consequently it was not considered by Massport to pose a significant threat to Boston Harbor. Despite the relatively benign impact of runoff generated at the site, mitigating measures were proposed in the FEIR/EIS for implementation during the construction of the project and during its the ultimate operation.

Since the publication of the FEIR, further engineering work has refined the stormwater runoff measures that will be implemented during the operation of the facility. As originally proposed in the FEIR, approximately one third of the BIF project area was to be serviced by a stormwater collection system discharging directly to the harbor. Since that time, Massport has determined to collect runoff and transport it to the existing West Outfall, passing through an existing oil/water separation unit within the outfall prior to discharge to the harbor. This change would provide for collection and treatment of stormwater flows generated over the entire BIF site. The increase in the area serviced represents a five year storm flow of approximately 610 cubic feet per second, which is considered well within the excess capacity of the oil/water separator system at the West Outfall.

4.4 Traffic Impacts

With or without development of Bird Island Flats, airport access and on-airport roadway congestion are among the most important problems facing Massport. During the comment period following publication of the Final EIR, it became apparent that

the traffic implications of the BIF development were a major concern of the MEPA staff and other reviewers. Therefore, subsequent to the publication of the FEIR, Massport, with assistance from professional transportation consultants, performed additional clarifying analyses of the incremental traffic impacts associated with the FEIR Proposed Development Plan. Traffic impacts of the revised PDP (or "RFEIR Proposed Development Plan") were also estimated.

This chapter summarizes the methodology and assumptions utilized in the analysis, and presents the results. Appendix B-1 describes the methodology and assumptions in detail and includes the text of the consultant reports from which the analysis was derived.

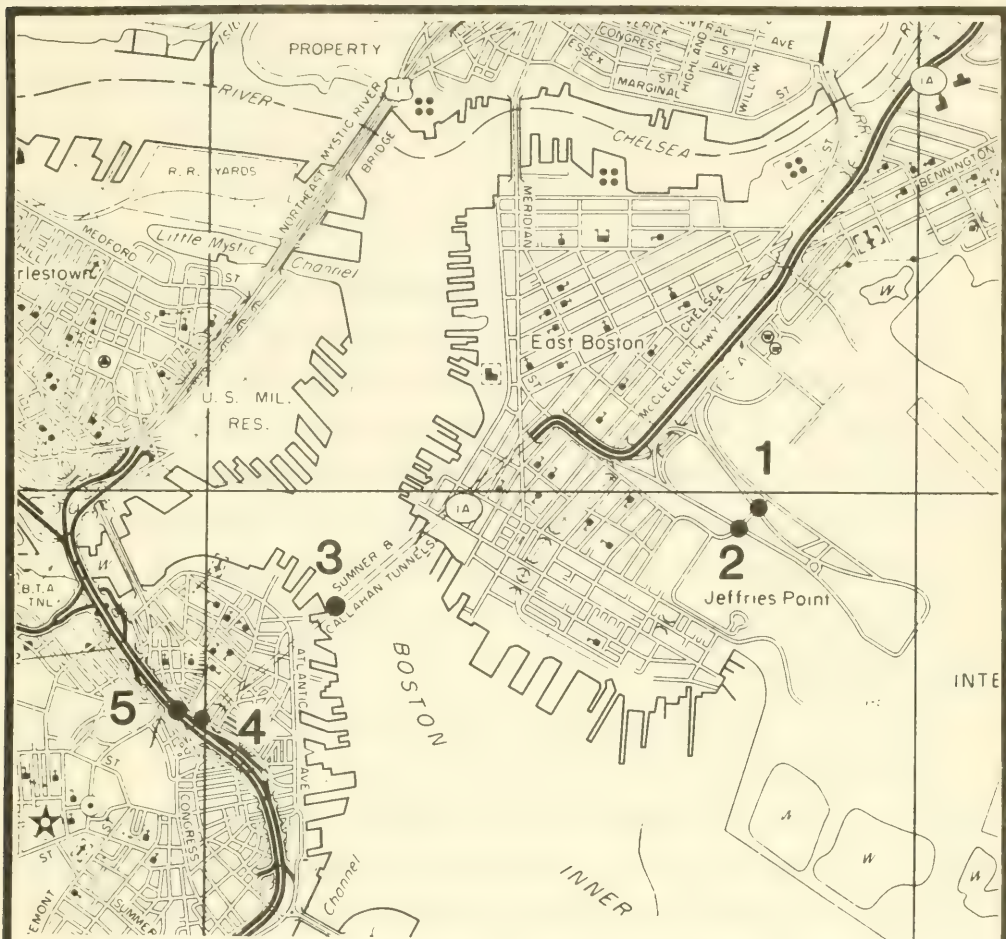
4.4.1. Traffic Analysis Methodology

The FEIR traffic analysis was based largely on automobile ADT (Average Daily Traffic) levels. Because traffic is most seriously congested on and off-airport during the late afternoon, the analysis was expanded to include the estimation of BIF-related traffic generated between 4:00 and 5:00 p.m., the (p.m.) peak traffic hour. Afternoon peak hour traffic flows and resulting roadway performance measures were estimated by adding BIF-generated traffic to the forecast no-build or baseline traffic flows. 1987 was selected as the forecast year, because it is the year by which the cargo and mixed-use development are anticipated to be completed.

For this expanded analysis, Massport revised the FEIR ADT trip generation rates, calculated ADT trip generation rates for uses incorporated in the RFEIR Proposed Development Plan, and calculated p.m. peak hour generation rates for FEIR and RFEIR land uses. These calculations allow comparison of relative ADT and p.m. peak hour traffic contributions of the FEIR and RFEIR programs. Then, by adding the BIF-generated p.m. peak hour traffic to the forecast no-build traffic flows, Massport calculated roadway service levels for five critical roadway locations, two on airport (the intersection of the inbound roadway and the airport crossroad, and the intersection of the outbound roadway and the crossroad) and three off airport (within the Sumner Tunnel, at the merge point of the Sumner Tunnel on-ramp to the Central Artery northbound, and at the pedestrian crossing signal near the intersection of the artery frontage road and Hanover Street in the North End). These locations are shown in Figure 8.

The measure used to reflect service levels was the ratio of forecast traffic demand to estimated roadway capacity, termed a volume to capacity ratio (V/C). This additional measure was suggested to Massport by the MEPA staff during the FEIR review and comment period. A roadway link or intersection which is estimated at to be at volume to capacity ratio of 1.0 is accommodating the maximum volume of traffic theoretically possible. Excess traffic demand reflected in a V/C greater than 1.0 would theoretically be accommodated through a longer peak period, or through the diversion of traffic to other routes and

ANALYSIS LOCATIONS



LEGEND

1. Cross Road and Exit Road
2. Cross Road and Entrance Road
3. Sumner Tunnel
4. Frontage Road Pedestrian Signal
5. Central Artery Northbound On-Ramp

other travel modes. In addition, some trips might not be made. Traffic theory and observation indicate that total traffic volumes accommodated by a roadway link or intersection actually decline when the ratio of traffic demand to capacity exceeds the level of 1.0.

4.4.2. Mitigating Measures Evaluated

The effects of various mitigating measures to which Massport is committed as part of the BIF project were also incorporated into the traffic analysis. Chapter 5 describes these mitigating measures. Appendix B-1 discusses the assumptions that were used in estimating their likely effectiveness. The three categories of mitigation that were quantitatively incorporated into the analysis are summarized below, and discussed further in Chapter 5, Section 5.3.

1. Measures to Minimize Automobile Traffic Generated by BIF Development.

- Comprehensive ridesharing program, including carpooling, vanpooling, and preferential parking locations and rates for participants.
- Encouragement of transit use through MBTA and Massport shuttle bus pass programs and subsidies.
- A new Massport shuttle bus loop providing a direct connection between the Airport MBTA Station and BIF.
- Ferry service between the downtown Boston waterfront and BIF.

The estimated effect of these measures is a 9.1% transit/ferry mode share (compared to an existing 6.6% share for current airport employees) and an increase in employee automobile occupancy from 1.2 to 1.4 occupants per vehicle in the p.m. peak hour.

2. Measures Designed to Reduce Non-BIF-Related Automobile Traffic Generated by the Airport.

- Airport-wide employee ridesharing program.
- Increased employee parking fees.
- Promotion of MBTA pass program.
- Development of North Shore Express bus service.
- Development of airport/bus/limousine services.
- High quality airport shuttle bus service between airport MBTA station and terminals.

The estimated effect of these measures is an increase in employee automobile occupancy from 1.2 to 1.4 in the p.m. peak hour, and a 10% increase in employee and air passenger transit use.

3. Low Capital Physical Roadway Improvements Designed to Increase On-Airport Roadway Capacity.

In addition to mitigating measures designed to minimize traffic volumes, Massport also intends to undertake a comprehensive program of low-capital on-airport roadway improvements to increase roadway capacity. The improvements are focused on the intersections of the inbound and outbound roadways with the north/south crossroad. These improvements are independent of and in no way affect the implementation of

long-term improvements to the north-south crossroad which Massport is now considering as part of its long range Master Plan effort and which will be subject to a separate environmental review.

For the purposes of this analysis, a representative improvement program was investigated which provides a minimum level of increased capacity. Before implementing such a program, Massport would complete a detailed review of all low-capital opportunities and related traffic management strategies for further increases in capacity at the airport which Massport believes are achievable. The representative improvements considered for purposes of this analysis are displayed in Figure 9. They include:

- o A U-turn connecting the inbound and outbound roadways on the terminal side of the crossover roadway. This turn would accommodate traffic travelling on the outbound road with a destination in the terminal area. This is the major potential source of added capacity at the outbound roadway/crossroad intersection.
- o A "jug-handle" on the terminal side of the inbound roadway/crossover intersection for left turns from the inbound roadway to the northbound section of the crossroad. This improvement will eliminate left turns from the inbound roadway at the intersection. It will include a dedicated deceleration lane from the inbound roadway.

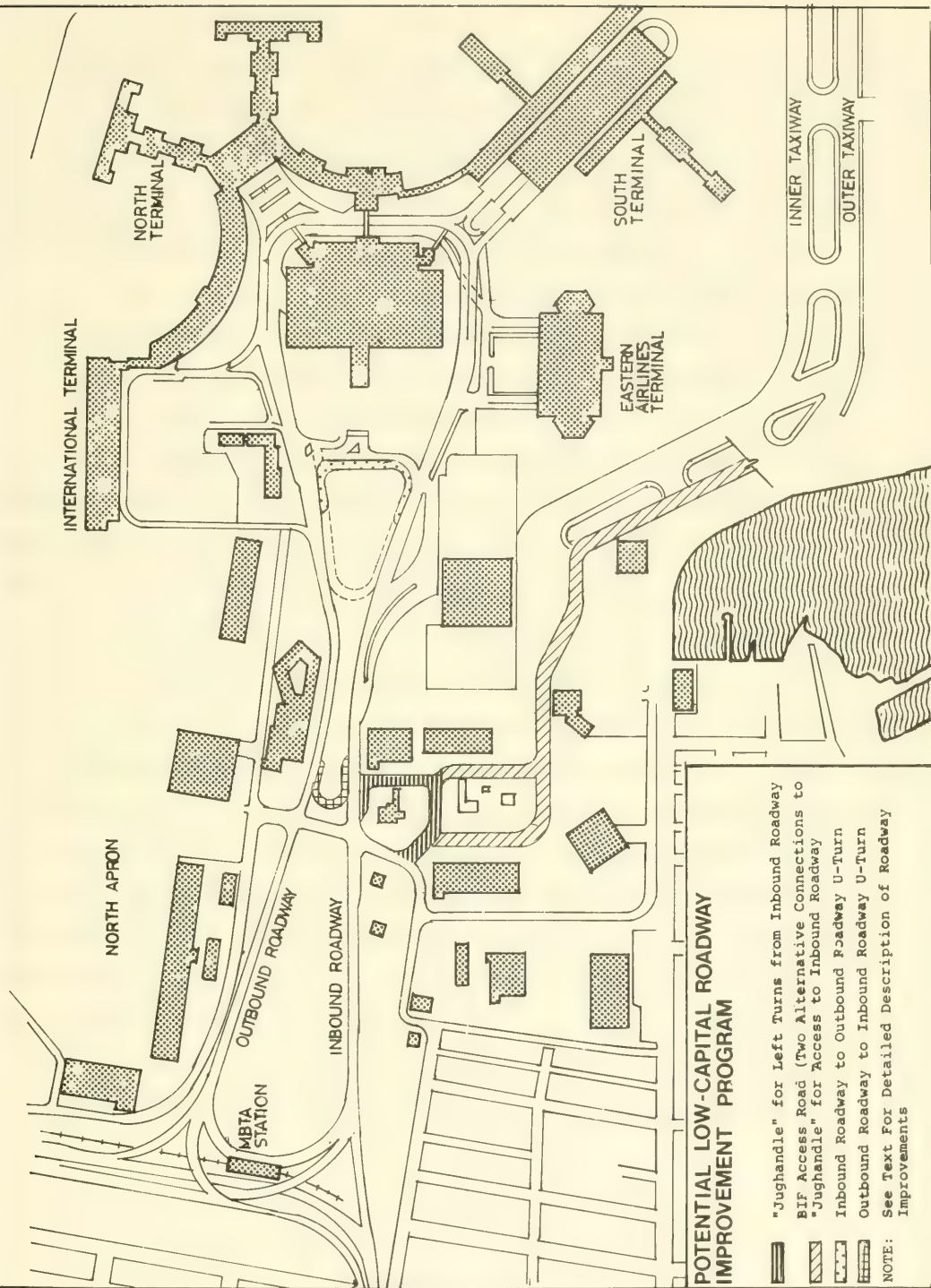


FIGURE 9

- o Elimination of all left turns from the outbound roadway to the crossroad. Traffic destined to the terminal area would utilize the U-turn. Traffic destined for the southwest area of the airport could utilize the MBTA ramp and turn right at the inbound/crossroad intersection.
- o A U-turn connecting the inbound roadway to the outbound, in the area of the access and exit roads to the Central Parking Garage toll plaza, with acceleration and deceleration lanes as required.

In addition to these non-BIF related improvements, traffic congestion at the crossover intersections will also be decreased by the planned connection of the BIF access road to the inbound road via one of two Massport easements west of the existing Eastern Air Lines' air freight building. This two-way roadway will have acceleration and deceleration lanes on and off the inbound roadway. Exiting traffic will reach the outbound road via the second U-turn described above. An important environmental benefit of this access road will be the elimination of direct access from BIF to Porter and Maverick Streets for outbound traffic. In order to utilize these streets, BIF-generated traffic would have to exit from BIF as described above, make a U-Turn at the MBTA bus ramp and drive back in the inbound road to the crossroad intersection. This circuitous routing would act as a substantial disincentive for traffic to

exit through the community. In addition, the roadway improvements will put the inbound roadway intersection well below capacity in 1987 (under either the FEIR or RFEIR development program). Traffic would therefore face no greater incentive to enter via community streets than it does today. Currently, most community street use is for exiting traffic. Therefore, there would be little if any reason for BIF development to increase the use of Porter and Maverick for entering traffic.

As discussed in Chapter 5, Massport is committed to minimizing all airport-related traffic impacts in the community, and will complete a thorough traffic impact analysis by the end of July, 1981. This analysis will identify the steps to be taken to minimize traffic through community streets due to all airport operations, not just BIF development. It will be coordinated with the further review of on-airport, low capital roadway capacity improvement opportunities discussed above. The product of the analysis will be a recommended program of low-capital roadway improvements which will provide adequate capacity at least through 1987 and will reduce community traffic impacts to the maximum feasible extent.

4.4.3. Results

Tables 4.4.1, .2 and .3 summarize the quantitative results of the traffic analysis.

Table 4.4.1

Comparision of Mitigated ADT's Generated
By FEIR and RFEIR Development Programs

FEIR Program:

<u>Activity</u>	<u>ADT</u>
Air Cargo	
Cars	1,300
Trucks	2,440
Office	4,329
Hotel/Conference Center	2,190
Light Manufacturing	951
Shuttle Bus	<u>50</u>
Total Vehicles	11,260
Total Airport with BIF*	49,000

RFEIR Program:

<u>Activity</u>	<u>ADT</u>
Air Cargo	
Cars	1,300
Trucks	2,440
Office Building	
Visitors and Employees	1,248
Conference Center Visitors	200
Computer Marketing Visitors	164
Conference and Computer	500
Shuttle Bus	<u>50</u>
Total Vehicles	5,902
Total Airport with BIF*	44,000

* Based on 1987 estimated base of approximately 38,000 mitigated ADT.

Table 4.4.2

Comparison of Mitigated P.M. Peak Hour Traffic Generated
By FEIR and RFEIR Development Programs

1987

FEIR Program:

<u>Activity</u>	<u>Entering</u>	<u>Exiting</u>
Air Cargo		
Cars	44	84
Trucks	53	53
Office	115	590
Hotel/Conference Center	61	51
Lt. Manufacturing	<u>32</u>	<u>177</u>
Total Vehicles	296	955

RFEIR Program:

<u>Activity</u>	<u>Entering</u>	<u>Exiting</u>
Air Cargo		
Cars	44	85
Trucks	53	53
Office Building		
Visitors and Employees	28	142
Conference Center Visitors	0	50
Computer Marketing Visitors	6	6
Conference and Computer Marketing Employees	29	159
Shuttle Bus	<u>13</u>	<u>13</u>
Total Vehicles	173	507

Table 4.4.3

P.M. Peak Hour Level of Service Results

Case	Entrance Road	Exit Road	Sumner Tunnel	Hanover Street	Artery Merge
1. 1979 Existing Conditions	.87	.88	.65	.79	1.01
2. 1987 No-Build Unmitigated	.99	.99	.73	.88	1.15
3. 1987 No-Build Mitigated with Roadway Improvements	.80	.81	.72	.87	1.13
4. 1987 FEIR Development, Mitigated With Roadway Improvements	.86	1.05	.84	1.01	1.20
5. 1987 RFEIR Development, Mitigated With Roadway Improvements	.84	.94	.79	.94	1.18

The ADT and P.M. peak hour traffic generation comparisons reveal that the RFEIR Proposed Development Plan will generate significantly less traffic than the FEIR program. This reduction in traffic is reflected in improved V/C ratios for the RFEIR program.

The V/C results summarized in Table 4.18-3 lead to several important conclusions:

- ° With mitigating measures and on-airport roadway improvements, the RFEIR development program will not result in critical on-airport intersections exceeding capacity in 1987.
- ° Unlike the traffic levels associated with the generic FEIR program, the RFEIR program (with mitigating measures) will not result in an exceedance of capacity at the Hanover Street/Frontage Road intersection in 1987.

- o Sumner Tunnel capacity will not be exceeded, under either development program. The delays currently encountered in the tunnel are due to congestion at the CBD exit, as a result of Central Artery congestion, and are not due to exceedance of theoretical tunnel capacity.
- o 1987 forecast traffic levels for the no-build case as well as for the FEIR and RFEIR programs, will result in an exceedance of capacity at the Central Artery merge point of the northbound ramp from the Sumner Tunnel. That roadway location is currently operating at capacity, a condition that will intensify through normal traffic growth even without BIF development. The RFEIR development causes only a slight increase in the 1987 V/C ratio over the no-build case with mitigation and roadway improvements.

Obviously, inadequate capacity on the Central Artery and its connections with other major highways is the principal cause of delays and queues observed in the evening within the Sumner Tunnel, at the tunnel portal in East Boston and on the airport's outbound road. The Central Artery is a major transportation facility whose congestion reflects regional traffic problems. The projected traffic flows associated with BIF activity represent a relatively minor contribution to this problem, and it would simply be inaccurate to conclude that the BIF program proposed here is either the cause of this regional problem or is

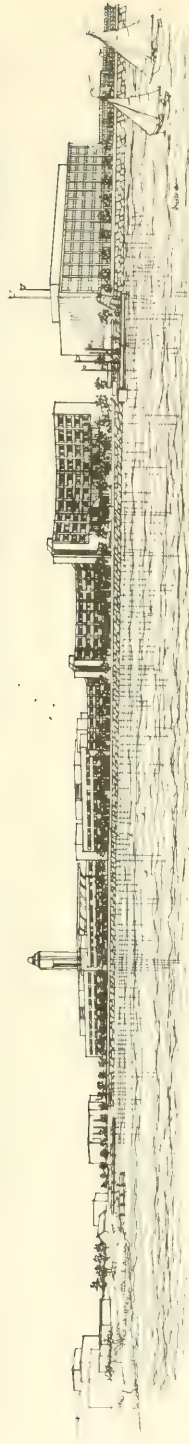
contributing congestion in some disproportionate way to congestion caused by Central Artery-dependent development which is proposed in Boston's regional core.

4.5 Visual Impacts - Active Versus Passive Buffer

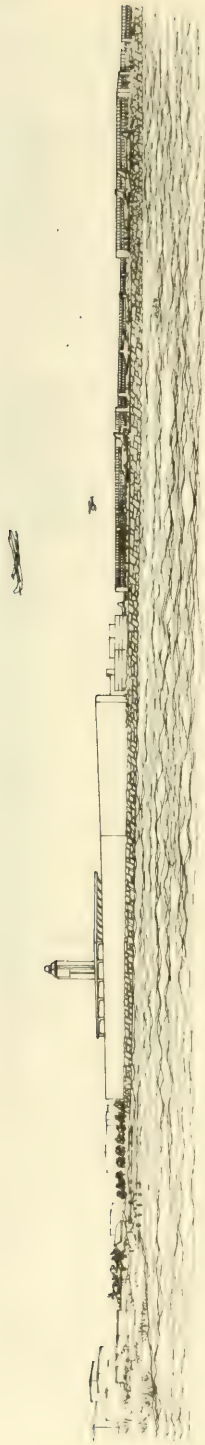
In the course of earlier discussions of the active versus passive options for the buffer zone contained in the DEIR and FEIR, and during the comment period on the FEIR, attention was focused on the noise impacts, and financial cost impacts of the choices between these options. Another key environmental impact affected by this choice is the visual quality of an active versus passive buffer. Accordingly, Massport commissioned a visual analysis of the two alternatives from a public perspective, the view from outside the airport. Two artist renderings were produced.

Figure 10 shows what the buffer zone area might look like if it were occupied by commercial structures as called for in the active buffer concept. In contrast, Figure 10 shows a 40 foot high, 1000 foot long wall, in accordance with the passive buffer zone concept.

These renderings support Massport's judgment that the passive buffer concept has a far greater adverse visual effect than the active buffer concept. It also underscores one of the factors underlying the historic opposition of the impacted Jeffries Point community to a passive wall, as discussed elsewhere in this report.



VIEW OF DEVELOPMENT SITE
ACTIVE BUFFER
REVISED FINAL ENVIRONMENTAL IMPACT REPORT
APRIL, 1981



VIEW OF DEVELOPMENT SITE
PASSIVE BUFFER
REVISED FINAL ENVIRONMENTAL IMPACT REPORT
APRIL, 1981

4.6 Environmentally Preferred Alternative and the Proposed Development Plan

Massport finds that the Proposed Development Plan, including both the program outlined in the FEIR and the refinement of that program presented in this RFEIR, is by far the environmentally superior alternative among the various options considered for BIF development. The reasons for this position are explained in part in the FEIR, Chapter 4, Section 4.17 and are addressed further below.

As we have seen in this report, the central environmental issue associated with the proposed development of Bird Island Flats is the impact of aviation noise on the East Boston community. Historically, this has been the dominant environmental impact of concern to Logan Airport's impacted communities. Therefore, a major policy criterion shaping Massport's development of BIF alternatives for purposes of analyses in the EIR, and constraining its choice among alternatives for purposes of implementation, is whether the alternative will serve to reduce the undisputed adverse impacts of noise generated by cargo and aircraft activity at the airport. Thus, while other environmental impacts are of concern, including traffic and related noise and air quality impacts, and while these have been extensively analyzed in the RFEIR/FEIR/DEIR, the fact remains that the critical environmental objective must be to continue to take all feasible measures to mitigate environmental damage occasioned by cargo and other aircraft activities.

On this basis, Massport has given extensive consideration to the suggestion that Massport abandon construction of the mixed use aspect of the Proposed Development Plan and implement an all cargo/aircraft support alternative at BIF. A major consequence of such an approach, were Massport to adopt it, would be to permit the utilization of Bird Island Flats for substantially more direct aircraft activity than is presently embodied in the Proposed Development Plan. Such increased activity would potentially involve the use of the transition zone -- set aside in the FEIR and RFEIR PDP for mixed use development -- for apron space or for taxiway or for other noise-generating aviation uses which would seriously degrade the environment of the East Boston community. Moreover, the mitigation of such environmentally adverse effects would be extremely difficult. For example, were the southwestern corner of BIF (reserved in the revised PDP for location of the computer information and marketing center and for a conference center) made available for uses generating aviation noise, it would be necessary in order to shield the East Boston community from these noise sources to extend the 1000 foot "passive" wall still another 1800 feet to the edge of BIF. This wall would have to be constructed at a height of at least 40 feet and likely higher in order to achieve mitigation of aviation noise at these point sources.

It is not unusual, in dealing with the question of the "environmentally preferred alternative" for a complex, major, publicly sponsored development, that there are multiple environmental impacts, and that an alternative which is

environmentally preferable on one impact criterion is disadvantageous on another. It is thus true that in certain cases tradeoffs must be made among environmental values in order to arrive at the project choice which best meets the environmental standards embodied in the Massachusetts Environmental Policy Act. These tradeoffs can make the determination of the environmentally superior alternative extremely difficult.

Fortunately, in the case of BIF, the tradeoffs are not as acute. That is, the mixed use aspect of the development proposed by Massport would, in the absence of mitigating measures, occasion certain, adverse consequences related to increased traffic. However, the Proposed Development Plan does not create unacceptable traffic impacts in light of the mitigation measures which Massport is prepared to adopt on its own authority and of the measures which Massport is prepared to assist the Commonwealth to implement under the state's jurisdiction over the region's transportation system. At the same time, the PDP does serve to reduce substantially the aviation noise which would otherwise be permitted under other alternatives to the PDP evaluated in the RFEIR/FEIR/DEIR. The converse is not true, however: the all-cargo and aircraft development option suggested by certain FEIR/EIS commentators would generate visual as well as noise impacts on the East Boston community which Massport has determined to be completely unacceptable, and would occasion greater traffic impacts from cargo-generated truck movements than is the case under Massport's PDP.

Accordingly, Massport believes that the Proposed Development Plan would best serve the overall environmental policies articulated in MEPA, and articulated independently in Massport's own policy statements and positions adopted during the period from 1975 to the present. This issue is reviewed further in connection with mitigation strategies, (see Chapter 5, Section 5.1.) As already explained in Chapter 1 of this Report, the Proposed Development Plan clearly is superior in terms of achieving other, non-environmental policy objectives essential to the feasibility and success of the BIF development program for Logan Airport.

CHAPTER 5 - MEASURES TO MITIGATE ADVERSE ENVIRONMENTAL IMPACTS

In the FEIR, Massport recognized its responsibility to address adverse environmental impacts of the Proposed Development Plan by examining possible mitigating measures, and by adopting such measures when feasible and practicable. In this Chapter of the RFEIR, Massport presents certain additional analyses regarding adverse impacts and mitigating measures. The information is organized as follows:

- ° 5.1 - Mitigation through Mixed Use Development.
- ° 5.2 - Other Mitigation of Adverse Impacts of BIF Development.
- ° 5.3 - Additional Mitigation of Adverse Impacts Related to BIF Traffic.

In keeping with the framework for presentation of mitigation analysis in the FEIR's Chapter 5, the information presented in this Chapter of RFEIR covers only those measures which Massport is prepared to adopt alone or in conjunction with other public agencies (chiefly the Commonwealth of Massachusetts) which have relevant jurisdiction and legal authority. Additional mitigating measures were considered and are discussed elsewhere in this report but are not included below because their implementation was considered to be infeasible or impracticable at this time.

5.1 Mitigation Through Mixed-Use Development

There are several aspects of the choice which Massport has made to implement an active buffer rather than a passive wall and to establish the mixed use development on the western edge of BIF rather than an all-cargo program for that area. Financial, land use and aviation-related demand issues have been treated elsewhere in this Report. In this section, we focus on the environmental dimensions of these choices (also addressed in Chapter 4, Section 4.6).

Noise from existing operations at the Eastern and U.S. Air terminals has been identified as the dominant airport-related ground noise in Jeffries Point for both daytime and nighttime hours. This existing source is not caused by the BIF project; however, it is a long standing source of aviation noise at Logan Airport for which this project offers significant mitigating potential. Massport's analysis of this impact in the FEIR included assurance that mitigation would be provided either in the form of a passive barrier (a wall) or an active barrier (a series of buildings) or a combination of the two whose location and physical characteristics would be sufficient to provide at least 7 dB worst-case attenuation for this noise source as described in Section 4.1 of the FEIR.

During the course of our discussions with the City of Boston it became clear that the City held a strong preference for the active buffer on the basis that potential aircraft noise-producing uses must not be permitted to locate in the critical transition zone between the airport's cargo facilities

and the East Boston residential community. It has also become apparent that the Secretary of Environmental Affairs holds an opposite preference for the passive barrier in the apparent belief that the passive barrier will provide noise attenuation equal to an active barrier without the attendant environmental disbenefit of traffic generated by the proposed active uses. To clarify Massport's position on the active vs. passive barrier issue with respect to the relative mitigation provided by each, three issues are reviewed below.

First, the attenuation of a wall is not equal to that of a building. As noted in Appendix B to the Final EIR (Page B-86), the computer program used in the calculations of the acoustical characteristics of the respective barriers tends to underestimate the effectiveness of the buildings in reducing noise levels. These calculations indicate that an active buffer consisting of buildings would be 2 to 3 dB more effective than a barrier consisting only of a wall. Given the universally recognized need for a noise barrier, there is a significant noise benefit in having a building rather than a wall (since 3 dB is usually considered equivalent to doubling the number of annoying events).

Second, it has been suggested by Secretary Bewick that Massport "mitigate" the traffic impacts of the mixed use element of the Proposed Development Plan by dropping this aspect of the program altogether and by erecting instead the passive buffer/wall. While there is no doubt that a project with a substantially smaller office component would have substantially lower traffic impacts, there is also no doubt that a smaller air

cargo project would have substantially lower aviation noise and air quality impacts. This raises the basic point of the mixed use development and what appears to be a basic misunderstanding among some commentators on the FEIR as to the purposes served by the integrated BIF project. An all cargo development is simply unacceptable to Massport in terms of aviation related land use objectives, financial requirements, environmental impacts, and cargo capacity requirements, as is an all mixed use development unacceptable for the same reasons. Massport's obligation has been to investigate options which -- consistent with the requirements of Section 61 of the Massachusetts Environmental Policy Act -- balance not only competing non-environmental objectives, but also the environmental objectives of mitigating aviation noise and minimizing traffic impacts associated with BIF development. See Chapter 4, Section 4.6. Given the predominance of the noise impacts in terms of adversity and concern to the community most impacted by operations in this area of the airport, it would be erroneous to conclude that an all cargo option is mitigating as to overall environmental impacts connected with Massport's proposed development.

A related point is that Massport's revised PDP involves substantial mitigation with respect to air quality related to traffic. As pointed out in the Draft EIR, carbon monoxide concentrations on BIF are sensitive to the location and density of office buildings on the site. The DEIR reported that the high intensity cargo with mixed use alternative would have CO hot spot resulting from the siting of all of the office space on the southwest corner at BIF.

In the FEIR analysis of the Proposed Development Plan this hot spot was eliminated by distributing the office space between the southwest corner and the area planned for the acoustic buffer. Thus, the active buffer provides mitigation of an air quality impact which would occur if the entire office development were confined to the southwest corner of the site.

Third, one must evaluate the visual/aesthetic impact of the proposed noise barrier on the Jeffries Point neighborhood and the public safety of the public access strip along the western shore. See Chapter 4, Section 4.5. If Massport were to build a wall in this location, we would intend it to be a visually attractive structure which included landscaping and other features designed to improve its appearance. Nevertheless, the possibilities available to enhance the appearance of a 40 foot high wall in excess of 1000 feet long are substantially more limited than the options which are presented by integrating the public access strip along the shore into the design of a series of connected buildings. The need to provide personal security at the public access way is likewise more amenable to appropriate treatment if it is not isolated by a 40 ft. high wall from airport activities normally provided by security protection.

The City of Boston has also expressed concern that air cargo activity would commence before commercial development in the buffer and mixed use area was assured, with resulting negative impacts on nearby residential areas. The City desired to see Massport give the mixed use project element high priority. Massport believes that an essential and required element of the

BIF environmental review is to avoid recurrence of the sort of extreme conflict which has existed in the past because of basic land use incompatibilities, and to utilize the opportunity presented by this development to restructure the airport/community interface with activities which support and enhance the value of Logan to its users. Massport thus is committed to proceed with the commercial development portion of this project. Further, it is essential to assure the City, its residents, and the potential airport beneficiaries of the mixed use area that it will proceed on an expedited timetable and that the transition zone mixed use development will not be displaced by incompatible aircraft related land uses beyond the reasonably foreseeable requirements of the airport simply because those aircraft related uses are capable of being developed in a shorter time period.

Mitigating Measure: Massport will include in the BIF project either a continuous row of buildings or a structure consisting predominantly of buildings and interconnecting walls whose location and physical characteristics are sufficient to provide 7 dB attenuation for the relevant noise sources and under the worst-case conditions as described in Section 4.1 of the FEIR. Massport finds that an active buffer (buildings) is feasible and practicable from operational, financial and engineering viewpoints. Massport will permit cargo operations on the eastern portion of the site which is designated for cargo use in the RFEIR, but will not permit operations to commence on the

western portion of the cargo development area, unless and until a developer has been designated and a binding contractual commitment for a mixed use and buffer zone development has been obtained consistent with the Proposed Development Program outlined in the FEIR and its refinement described in the RFEIR.

Further, in order to assure the functional integrity of the transition zone created by the active buffer and mixed use areas, Massport will guarantee public use of a landscaped access strip along Massport properties fronting on Jeffries Point cove from the southwesterly corner of Bird Island Flats to Maverick Street and will make every effort to continue this public access strip completely around the cove beyond Joe Porzio Park and the Jeffries Point Yacht Club to the Massport owned "Navy Fuel Pier".

5.2. Mitigation of Other Impacts of BIF Development

In this section of Chapter 5, Massport reviews again certain measures (other than traffic mitigation measures, which are required in Section 5.3 below) to mitigate harm potentially associated with BIF development which were considered in the FEIR and concerning which questions or comments were offered during the review of the FEIR following its publication last December. Certain additional measures are also included. As will be noted below, some measures described here were also included in the FEIR. Measures not discussed below but which were included in the FEIR remain unchanged.

5.2.1. Ground Noise From Cargo Aircraft (Nighttime)--Additional Mitigating Measure Required by U.S. Department of Transportation.

In a letter dated December 17, 1980, the U.S. Assistant Secretary of Transportation, for Policy and International Affairs stated: "My concurrence in this document is conditioned on implementation of the mitigation measures set forth in the draft record of decision and the EIS, including towing of aircraft under circumstances specified on page 5-2 of the EIS. If towing under such circumstances is not implemented, development in the area where towing was prescribed will not go forward unless a new proposal and accompanying EIS for this area are approved."

Mitigating Measure: Given that the U.S. Secretary of Transportation conditioned Federal approval of the Final Environmental Impact Statement upon the adoption of this mitigating measure, Massport restates its intention to abide by its conditions.

5.2.2. Additional Mitigation Measure re: Cargo Aircraft and Operations Nearest Jeffries Point.

During the course of the discussions conducted during the comment period with the City of Boston and with community residents, it became clear that the issue of cargo aircraft operations occurring on the portion of the east-west cargo apron nearest Jeffries Point was an issue of serious concern. As a result of these discussions Massport agreed, in an exchange of letters with Mayor White of the City of Boston, on February 12, 1981 (Appendix A-4) to reorient the westerly 440 feet of the main cargo building from the east-west orientation shown in the

Proposed Development Plan in the FEIR to a north-south orientation as shown on Figure 3. This reorientation would eliminate cargo aircraft operations at two apron positions nearest the community and the 40' high north-south building would offer the potential of further shielding the community from aircraft noise emanating from cargo apron activity further to the east. In order to document these benefits Massport analyzed the effect of this building reorientation. The principle conclusions can be summarized as follows:

1. The reoriented building layout does not alter the peak noise level or number of events which occur during the taxi portion of aircraft operations on the east-west taxiway (which will remain unshielded by the north-south building).
2. The reoriented building layout reduces the hourly equivalent sound level by approximately 1 1/2 dB.
3. The reoriented building layout reduces the percentage of time when noise levels are above 65 dB(A) by approximately 25%.

Mitigating Measure: In order to assure these benefits Massport will commit itself to this reorientation as a further mitigating measure, and will not utilize the westerly 440 feet of the apron area shown in the revised PDP (2-747 apron positions) for aircraft operations, unless the City and the Authority are able to agree on an operationally feasible alternative which is a superior means of mitigating environmental harm.

5.2.3. Mitigation Related to Freight Forwarder Activities

The City and its residents have expressed two concerns regarding the designation in our Proposed Development Plan of certain areas as freight forwarder facilities:

1. That such intense truck generating activity should be located away from the airport to minimize the number of truck movements to and from the airport to the absolute minimum of fully loaded two-way truck movements.
2. That the question of re-use of neighborhood locations vacated by forwarders who relocate to BIF should be addressed in order to avoid re-use by similar, incompatible activities.

Massport's inclusion of freight forwarding areas in its Proposed Development Plan was in furtherance of our 1976 Master Plan Policy of encouraging freight forwarders to relocate out of the community. See Chapter 3, Section 3.2. This policy was strongly supported by both the City and East Boston residents at that time. Since that time three distinct patterns of forwarder activity have developed which affect the implementation of that policy.

First, there are forwarders who have traditionally sought relatively low cost space, often in residential neighborhoods, and who contribute to traffic problems on local streets having access to the airport. This trucking activity also contributes to on-airport traffic congestion by increasing the number of turning and through movements at the main roadway intersection.

Second, more highly capitalized forwarders tend to locate in modern facilities on larger parcels in industrial areas. This pattern is visible along Route C-1 north of the Airport, and in sections of Chelsea and Revere having good highway access to the airport. These forwarders perform their collection and distribution functions in sites which are remote from both the airport and from residential neighborhoods and contribute minimally to traffic on either the airport roadways or the local street system.

The third category of forwarders consists of firms which have recently commenced shipment of freight in owned or leased aircraft. This category of forwarders have an obvious functional need to locate on the airport adjacent to aircraft aprons.

Massport agrees with concerns that not all cargo forwarding activities have a functional need to be located on the airport. Indeed those activities are a prime example of aviation related uses which may have a lower priority for airport space than related uses such as hotels or airport office areas which have higher functional relationships to airport activities.

Therefore, while Massport believes that it is important to designate some portions of BIF for use by certain forwarders which can appropriately locate on-airport, it is important to gain a fuller understanding of the impact of these activities on local land uses and traffic flows, and to rationalize the future development of forwarding activity in a manner which utilizes space on BIF and in appropriate off-airport locations to the benefit of all concerned.

Mitigating Measure: Massport will sponsor a study of existing land use and airport-related traffic patterns in East Boston for the purpose of developing basic information related to the forwarder problem just outlined. This study will be conducted in cooperation with the Cities of Boston, Chelsea and Revere, and local residents. At the conclusion of this study Massport will sponsor a series of discussions with affected municipalities, residents, and members of the forwarding industry and will provide further support to assist the various parties in planning the rational development of off-airport forwarding activity.

Additionally, as understandings regarding additional strategies which would achieve relocation in a positive manner are achieved, some of which would involve Massport action, the Authority is prepared to adopt such measures as additional steps to mitigate harm otherwise potentially associated with BIF development.

5.2.4. Mitigation of Construction Truck Noise (FEIR)

Additional questions were raised during the review and comment period on the FEIR regarding construction truck noise, and Massport's commitment to institute strategies to reduce such adverse impacts.

Additional Mitigating Measure: In lieu of measures 2 and 3 at p. 5-4 of the FEIR:

1. Massport will install a 17' high temporary noise barrier along the existing airport service road adjacent to

Maverick Street prior to using this roadway for construction vehicle access to the BIF site.

2. Massport will establish a temporary truck route which approximates the location of the proposed permanently relocated BIF service road, entering through the existing south gate and travelling over an on-airport truck lane north of the general aviation area and Eastern Airlines reservation center. This route will be utilized during initial periods of construction activity until the temporary noise barrier along Maverick Street is installed.

5.2.5. Dust During Construction (FEIR)

The letter of the Assistant Secretary for Policy and International Affairs (mentioned in section 5.2.1.) also conditioned U.S. DOT's concurrence upon Massport's adoption of the mitigating measure stated in Chapter 5 of the FEIR (pp 5-4 to 5-5) and stated:

"In addition, the potential problems associated with dust and particulates appear significant enough to warrant continuous, on-site monitoring during project construction, the purpose being to avoid violations of total suspended particulates standards in Jeffries Point.

[DOTs] concurrence in the Final EIS is therefore conditioned also on steps being taken to assure that such monitoring will occur". (emphasis added)

Further concern was expressed by MEPA staff in discussions with Massport during the extended comment period on the FEIR. These concerns are that Massport clearly designate responsibility for initiation of dust control measures and specify dust control and monitoring requirements in construction contracts.

Mitigating Measure: Massport will:

1. Assume responsibility for on-site implementation of mitigating measures through its Engineering Department contract supervisor.
2. Incorporate dust control requirements of the FEIR and RFEIR into all construction contracts.
3. Re-assert its intention to conduct continuous on-site monitoring of particulates during construction, in order to avoid violations of Total Suspended Particulate standards in Jeffries Point.

5.2.6. Hydrocarbon Emissions (FEIR)

Air quality analysis conducted for the FEIR attempted to quantify airport contributions to odor problems in the surrounding neighborhoods by relating probable changes in odor intensity, character, and frequency of occurrence to total hydrocarbon emissions and concentrations. While correlations between THC and odor are extremely difficult to establish because of the relationship of odor to partially burned rather than to raw emissions, the HC inventory identified as part of this analysis indicates that a substantial portion of all airport hydrocarbons result from evaporation at fuel storage facilities. While the hydrocarbon emissions from existing fuel storage are only marginally related to the Bird Island Flats project and are unlikely to be substantial contributors to the airport odor problem, it is nevertheless true that these fuel vapors contribute to area-wide hydrocarbon concentrations and to photochemical smog production.

Mitigating Measure: Massport will require vapor recovery emissions controls for all new fuel storage and handling facilities on BIF or elsewhere on the Airport. Massport further agrees to study the feasibility of installing vapor controls at all existing airport fuel storage and handling facilities and upon completion of the study to promulgate a regulation requiring vapor controls which the study determines to be feasible.

5.2.7. Mitigation of HC Contamination Borne by Water Runoff (FEIR)

The FEIR stated that all surface runoff from areas having a high potential for fuel or other hydrocarbon spills would be treated; either through the existing oil/water separator at the west outfall or at a new separator to be constructed as part of the project.

Several commentators (notably, the Boston Conservation Commission) have indicated the desirability of processing all surface runoff through oil/water separators to assure that hydrocarbon spillage from roadway, truck dock, and other areas are not discharged directly into the harbor.

Mitigating Measure: Massport will route runoff from all paved surfaces on BIF to the existing oil-water separator located in the west outfall.

5.2.8. NOx Emissions

MEPA and other commentors have noted that concentrations of oxides of nitrogen are projected to continue increasing throughout the period during which the Bird Island Flats project

is implemented. This projected increase is principally caused by changes in the aircraft fleet assumed to be operating at Logan in the future, which are expected to continue the existing trend toward wide body aircraft having new technology engines and higher NO_x emission levels. Other attributes of this projected aircraft fleet are highly desirable (e.g.: substantial reductions in carbon monoxide and hydrocarbon emissions, lower noise levels, and higher passenger seating capacities). The projected increase in NO_x , however, has the potential to cause concentrations of NO_2 to exceed levels which are being considered for adoption as primary air quality standards.

Under current regulatory conditions Massport is preempted by federal authorities from the direct regulation of aircraft flight frequencies -- a regulation strategy suggested by MEPA staff as a possible mitigating strategy for NO_x . However, Massport is permitted to undertake a monitoring and emissions accounting program which would be a prerequisite for any future control strategy which might evolve.

Mitigating Measure: Massport will undertake an ongoing NO_x monitoring program to determine long term trends in NO_2 levels and to measure those levels against NO_2 standards which may be adopted by relevant regulatory authorities in the future. The program will include meteorological data analysis to assist in the interpretation of source contribution to ambient NO_2 concentrations.

The number of monitoring sites (no more than four), locations of monitors, data acquisition system, recording procedures and

quality assurance program shall be determined in consultation with DEQE and the Executive Office of Environmental Affairs (EOEA). In addition, monitoring will be undertaken to resolve the question of NO_x/NO_2 conversion rates.

If at any future time, monitoring indicates that the existing standards for NO_2 are exceeded, Massport will require each scheduled carrier serving Logan Airport to submit annual schedule change data, will perform an environmental audit containing an NO_x emissions inventory on each schedule submission, and will make all such inventories available to EOEA.

5.2.9. Mitigation of Airport Noise via FAR 36 Compliance Schedule.

Community members and MEPA staff have expressed concern about the effectiveness of federal regulations governing the compliance schedule for retrofit or replacement of older, noisier aircraft in the context of nighttime cargo flight operations as well as passenger aircraft activity. Federal regulations (CFR, 14, Part 91, subpart E) amended in January, 1980, require all subsonic, large transport category aircraft to meet the noise standards of CFR Part 36 according to a schedule based on the size of the aircraft. Masspsort shares the concern that further slippage in the implementation schedule under the Federal regulation may occur, rendering the EIR assumptions about noise emission levels in future years invalid.

Mitigating Measure: As an added assurance to the community and MEPA, Massport will commit to setting its own compliance ratios for individual airlines under Article II of the

Rules and Regulations for Logan Airport to conform with the schedule currently outlined in 14 CFR, Part 91, subpart E. Further, Massport will continue to maintain its current requirement as defined under Article III of those Rules and Regulations to the effect that aircraft operating in the late night hours maintain 100% compliance with Part 36.

5.2.10. Mitigation through BIF/PDP' Design Review

The site plan shown for illustrative purposes in this Report is a reflection of specific market information regarding demands for cargo and mixed use space on BIF. Obviously, specific elements of the mixed use and cargo elements will require further detailed site planning and design review.

Mitigating Measure: Towards this end, Massport will establish a Design Review and Advisory Committee to assist the Authority in further site planning and individual building design decisions. This group will:

- 1) Review and comment on design guidelines for air cargo and mixed use facilities.
- 2) Review and comment on detailed site plans and proposed building designs for BIF cargo development.
- 3) Review and comment on design features at the walk to the sea.
- 4) Review and comment on ferry boat dock and facilities when proposed.

Its membership will be:

- 1) Representatives of the affected East Boston community.
- 2) Representative of air cargo industry.
- 3) Representative of City of Boston.
- 4) Representative of Boston Architecture Society.
- 5) Representative of Boston Harbor Associates.
- 6) Representative of labor.

Massport may also appoint additional representatives of groups having a substantial interest in the detailed planning and design phase of implementation for this project. Massport staff assistance to the Committee will be provided.

It will make recommendations in formal reports (with staff assistance) to the Executive Director of Massport.

5.3 Mitigation of Adverse Impacts Related to BIF Traffic

Secretary Bewick has emphasized in his comments on the FEIR that traffic impacts of the development of Bird Island Flats for mixed use purposes require further mitigation in order to achieve levels of traffic which he considers acceptable. Massport has carefully considered both the scale and character of potential mixed use development and in doing so, has identified certain additional mitigation strategies which may be utilized to reduce potential traffic problems. These additional commitments are described in this section of the RFEIR, and supplement the measures already identified in the FEIR.

During the course of this review both before and after publication of the Final EIR, Massport also examined certain potential traffic impacts in the East Boston community associated with mixed use and cargo development on Bird Island Flats. One aspect of this involved the evaluation of certain roadway improvements on airport as well as certain traffic management strategies at the airport/community interface which would serve to minimize substantially (and beyond levels of mitigation identified in the FEIR) otherwise negative traffic problems in the community due to either the proposed development, or growth in existing airport traffic.

The discussion in this portion of the RFEIR covers mitigation measures which Massport is proposing to implement under its existing legislative authorization or in conjunction with the Commonwealth of Massachusetts and/or the City of Boston where the latter jurisdictions have the requisite authority, expertise and legal basis to implement the selected mitigation policy. Certain additional mitigation measures related to traffic were considered and are discussed in the Appendix B-1, but are not included here because a judgment was made that implementation was not feasible or practicable at this time.

Traffic mitigation measures are discussed as follows:

5.3.1. On-Airport Traffic Mitigation

5.3.2. Off-Airport Traffic Mitigation

5.3.3. Mitigation Related to Local Streets

5.3.1. On-Airport Traffic Mitigation Measures

As identified in Chapter 4, traffic levels on airport roadways have the potential to reach highly congested conditions either with or without the additional flows associated with a BIF project. However Massport has identified measures which will be applied to the airport as a whole and to various elements of BIF which will resolve this potential for congestion.

Mitigating Measure: Low Capital Roadway Improvements

Massport will undertake the following program of low-capital on-airport roadway improvements to increase the on-airport roadway capacity:

- ° A U-turn connecting the inbound and outbound roadways on the terminal side of the crossover roadway. This turn would accommodate recirculating traffic travelling on the outbound road with a destination in the terminal area. It is the major potential source of added capacity at the outbound roadway/crossroad intersection.

- ° A "jug-handle" on the terminal side of the inbound roadway/crossroad intersection for left turns from the inbound roadway to the northbound section of the crossroad. This improvement will eliminate left turns from the inbound roadway at the intersection. It will include a dedicated deceleration lane from the inbound roadway.

- ° Elimination of all left turns from the outbound roadway to the crossroad. Traffic destined to the terminal area will utilize the U-turn. Traffic on the outbound road destined for

the southwest area of the airport will be required to utilize the MBTA ramp and turn right at the inbound/crossroad intersection.

o A U-turn connecting the inbound roadway to the outbound, in the area of the entrance and exit roads to the Central Parking Garage toll plaza, with acceleration and deceleration lanes as required.

Certain of these roadway strategies were being considered by Massport as possible solutions to long-term congestion resulting from anticipated airport traffic growth prior to initiation of the BIF planning process, but it is now apparent that these measures will be required on an accelerated time frame in order to mitigate otherwise adverse impacts of the BIF development. It should also be noted that these near-term, low capital improvements are not a substitute for the longer-term major capital roadway improvements -- such as a grade separated north-south connector road, or re-structuring of portions of the existing dual level roadway -- which are being considered under the Logan Airport Land Use Plan. These will be the subject of separate traffic studies and environmental review.

Finally, it is Massport's view that other near-term, low capital roadway strategies may exist which offers even greater benefits than those described above. Massport will therefore continue to review the airport roadway system in a search for further improvement. In the event that more favorable options are discovered to be feasible they will be adopted as further mitigating measures.

Mitigating Measure: "Logan Commuter Plan" In order to provide a focus for actions designed to increase vehicle occupancy rates and transit participation for all airport employees, including those on BIF, Massport will commence a comprehensive ridesharing/transit program called "The Logan Commuter Plan". This program will consist of: ride matching, marketing, and problem resolution services provided for the carpooling/vanpooling program by two Massport administrators during the start-up period, followed by permanent assignment of a transportation professional devoted to the program; a six month operating subsidy of start-up expenses for the vanpooling program; provision of preferential parking rates and locations for car and vanpool participants; and a program of negotiations with employees to secure their adoption of employee payroll deductions for the MBTA pass program.

Mitigation Measure: MBTA Pass Subsidy In addition to the general program to increase airport-wide transit ridership through employer payroll deductions for the MBTA pass program, Massport will require as a condition of all lease agreements, that all BIF employers participate in a 50% subsidy of MBTA passes for their employees.

Mitigating Measure: Higher Employee Parking Fees Massport has recently voted to double the airport employee fees effective July 1, 1981 (from \$15 to \$30 per quarter). As a further mitigating measure to provide incentives for reduced automobile usage, Massport will adopt a further increase in employee parking fees in July 1982.

Mitigating Measure: Limited BIF Parking Auto use will be further discouraged by limiting available employee parking on BIF. The revised PDP includes 1,100 spaces split between the northern and southern areas of the BIF mixed use zone. As discussed in Chapter 4, traditional parking standards for the revised PDP would suggest providing substantially larger number of spaces. Excess demand among employees not choosing to participate in the ridesharing and other programs described above will be accommodated instead in a remote parking location. Significantly higher fees will also be charged for the use of employee parking spaces on BIF, except for carpools and vanpools. The net effect will be discouragement of single rider automobile use, through high parking rates and less convenient parking locations.

Mitigating Measure: Wood Island Parking Lot: Massport is the process of negotiating a lease the Wood Island parking lot from the MBTA. If secured, this lot will be rehabilitated, provided with improved security and access and will be utilized as a remote employee parking lot.

Mitigating Measure: Support of Increased Bus & Limo Service: Massport will support increased bus and limo services to Logan by providing staff support to potential operators in the areas of market research and preparation for regulatory proceedings. In the particular instance of service from the Lexington, Concord, Bedford areas, Massport will make up to 100 commuter parking spaces available for bus/limo users at Massport's Hanscom Field facility. In the specific case of

service between Logan and North Shore communities, Massport will make staff support available to potential operators to assist them in resolving MBTA jurisdictional impediments.

Mitigating Measure - Employee Shuttle Bus Fares Despite upward price pressures in the operation of Massport's shuttle bus, Massport will commit to retaining the current 25 cents fare structure for all airport employees using this service through the end of calendar year 1982 as an incentive to employee transit ridership, and in order to continue to monitor the potential utility of such services as part of Logan's overall program to reduce single-occupancy auto travel by Logan employees.

Mitigating Measure - Transit Access to BIF Massport will provide transit access between convenient locations and the MBTA station, the passenger terminals, and remote employee parking areas.

Mitigating Measure - Ferry Access to BIF: In January, 1981, Massport completed an initial Feasibility Study of a Cross Harbor Ferry Service. The study concluded that a market existed for such a service, particularly if development occurred at Bird Island Flats. Utilizing the most conservative estimates of ridership from the study, Massport believes that a ferry could generate ridership of at least 1.8% of Bird Island Flats employment. In recognition of this, Massport is conducting investigations of potential ferry sites necessary as precursors to separate environmental review of ferry service to BIF and will initiate further planning and engineering studies in 1981 leading to the implementation of this ferry service.

Mitigating Measure - Flexitime The traditional flexitime programs may actually exacerbate existing airport and tunnel peak traffic conditions. A more precisely targeted program of staggered employer quitting times designed to avoid concentrated traffic surges from BIF may be a preferable traffic management policy. Massport and reviewers of this RFEIR will be in a better position to identify which approach is more effective as specific details of the employee shift patterns become known. Massport will commit to requiring the adoption of either a traditional flexitime program or some other appropriate program of controlled quitting times for all BIF employees.

Mitigating Measure - Traffic Monitoring Program: While the traffic analysis in Chapter 4 has indicated that mitigating measures and Logan roadway improvements can do much to reduce the volume to capacity ratio for on-and off-airport roadways, Massport believes that the sensitivity of the traffic issue calls for unusual attention. Therefore, a traffic monitoring program will be designed and implemented to monitor roadway levels-of-service and the effectiveness of mitigating measures and roadway improvements, and to alert Massport and MEPA to the need for any further control measures. This program will monitor traffic conditions relating to all airport traffic, not just BIF-related flows, to identify the full scope of potential problems and solutions.

5.3.2. Mitigation of Off-Airport Traffic

Secretary Bewick and others have raised the issue of BIF - related impacts on regional highway facilities, especially the Sumner Tunnel and Central Artery. Massport believes that these facilities are either experiencing traffic problems at the present time, without BIF participation, or will be experiencing problems in the foreseeable future - even without BIF development. These areas are clearly regional traffic problems. Nevertheless, Massport has examined the impact of BIF on these facilities, and recognizing its regional responsibility is prepared to cooperate, along with other responsible state and local government units, in programs to address these traffic problems.

Massport agrees with MEPA staff that much of the congestion apparent at the entrance to the Sumner Tunnel relates to roadway design limitations on the Central Artery, and that feasible mitigating measures should be evaluated which address this problem. Massport is further concerned that the Central Artery capacity limitations and the attendant artificial restrictions on tunnel capacity will continue and, given the fundamental nature of this problem, might prove to be a major impediment not only to the proposed development at BIF; but also to the commercial development and economic viability of the entire central area of Boston. Any proposal for substantial future development in or on the periphery of the downtown area will be similarly constrained.

The mitigating measures contained elsewhere in the RFEIR are designed to take advantage of Massport's control over airport

access roadways and to effect airport-wide reductions in ADT's, as well as to reduce off-airport impacts, but these alone do not resolve the basic Central Artery problem.

Further actions can be taken, directly and indirectly, to address the Central Artery problem, and the North Station down ramp effect on Tunnel flows in particular. However, direct operating control of the facilities in question does not lie with Massport and further cooperation with Mass. DPW, MDC, the Mass. Turnpike Authority and the City of Boston is needed to implement the necessary measures. Nevertheless, Massport is willing to make the following specific commitments:

Mitigating Measure: Analysis of North Station Exit Ramp

Although the principal congestion point affecting north bound traffic is not directly controlled by Massport, the Authority will continue to pursue, as a Metropolitan Planning Organization member, potential joint resolution of regional traffic problems with Massachusetts Department of Public Works and other appropriate agencies. One such area involves limitations imposed by the insufficient weave distance between the Central Artery up ramp at the Sumner tunnel and the North Station down ramp. This could be mitigated by closing the North Station off ramp during peak tunnel flow periods. This is particularly attractive in view of the dissimilarity in peaking patterns between commuting flows through the tunnel and the flows associated with events at North Station. A properly designed study and a professionally supervised experimental closing of this exit can be devised to determine the likely benefits.

Massport is willing to engage a traffic consultant to analyze the benefits which might be obtained from closing the North Station exit from the northbound Expressway during peak tunnel traffic flow periods. This study will be closely coordinated with other MPO members to quantify the benefits of such traffic modifications.

Mitigating Measure: - One Way Bridge Tolls: It is likely that a perceived price incentive can be added to the congestion incentive to cause additional traffic to divert from the tunnel to the bridge. Ideally this should take the form of a one way toll on the tunnel and a one way toll on the bridge. Massport has already commenced discussions with the Massachusetts Turnpike Authority in the expectation that a suitable agreement for such a system can be reached.

Massport is willing to conduct a 3 month experimental program with the Turnpike Authority of one way toll collection on the Mystic (Tobin) bridge and at the Sumner-Callahan tunnels which under a program which will be monitored and documented by an independent traffic consultant.

5.3.3. Mitigation Related to Local Roadways.

Massport has recognized that the combination of existing airport traffic congestion and the availability of relatively less congested community streets can produce traffic flow patterns which exacerbate the congestion on both the airport and the local roadway systems. A prime example is the existing use of Porter and Maverick Streets by airport generated vans, taxis, limos, and employees as an alternate route to gain more favorable

positions in the entrance queues at the Sumner Tunnel toll plaza. This traffic exacerbates congestion at the main airport intersection by introducing a greater percentage of cross and turning movements at the north-south signalized intersection, thereby reducing the capacity to accommodate through movements on both the inbound and outbound airport roads. This traffic flow also introduces congestion at the off-airport intersections of Porter and Bremen Streets, and at the intersection of Visconti Way and Chelsea Street.

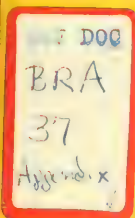
Except under the most extreme conditions of congestion when traffic backs up from the tunnel toll plaza to beyond the airport north-south intersection, the capacity of both the airport roadway and the local street system could be improved by requiring these vehicles to utilize the airport roadways connecting to Route C-1 and to discontinue use of Porter and Maverick Streets.

Massport is prepared to adopt a plan to eliminate the use of Porter and Maverick Streets by these vehicles through street closures which would fully or partly eliminate airport access/egress at those locations. These closures would supplement the traffic management and low-capital roadway improvements which Massport will also adopt, as described above, in order to insure that existing airport-related traffic impacts on the East Boston community are not exacerbated by BIF development.

However, prior to taking this action, Massport, in cooperation with the City of Boston and the affected community,

will complete an analysis of traffic movements using the Porter and Maverick Street entrances to the airport and feasible alternative measures to resolve both on-airport and off-airport traffic conflicts caused by those vehicle movements. This study will be complete by the end of July, 1981.

R. MERTENS



REVISED

FINAL ENVIRONMENTAL IMPACT REPORT

APPENDIX

PROPOSED DEVELOPMENT

OF

BIRD ISLAND FLATS

PREPARED BY

MASSACHUSETTS PORT AUTHORITY

BOSTON/LOGAN INTERNATIONAL AIRPORT

BOSTON, MASSACHUSETTS

APRIL 30, 1981



East Boston
M 65P
BIF
FEIR-A

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Appendix A - 5 Secretary's Comments and MEPA Staff Comments

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Certificate of the Secretary of Environ-
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MEPA Staff Comments

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Appendix B-3 Capacity Analysis - Generic FEIR with
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(Vanasse/Hangen - April 29, 1981).....B-3-1

Appendix B-4 Bird Island Flats
Traffic Impact Analysis
RFEIR
High Tech Center with Air Cargo Facilities
(Vanasse/Hangen - April 28, 1981)B-4-1

Appendix B-5 Demand Estimate For Ferry Service at BIF
(Lewin - March 11, 1981).....B-5-1

Appendix B-6 Impact of MBTA Pass on Transit Use
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Appendix B-7 Lower Bound Aviation Forecasts
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Appendix C-2	Memos by Traffic Engineers used in Air Quality Analysis.....	C-2

APPENDIX A - OFFICIAL CORRESPONDENCE

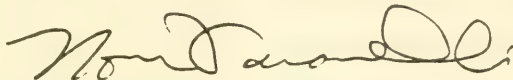
This appendix consist of five sections. Sections A-1, A-2, A-3, are Massport transmittals to MEPA during the Review Period on the Final EIR. Section A - 4 contains relevant letters on the FEIR, and A -5 contains the Secretary's comments (and press release) on the FEIR, as well as comments of the MEPA staff on the FEIR.

APPENDIX A - 1 - Errata Sheet sent to
reviewers of FEIR (January 16, 1981)

MASSACHUSETTS PORT AUTHORITY

TO: Reviewer of Bird Island Flats Final EIR/EIS
FROM: Norman Faramelli
DATE: January 16, 1981
SUBJECT: Errata Sheet

For your reference, we are sending you an Errata Sheet on the Final EIR/EIS on the Proposed Development at Bird Island Flats. As you will see, the changes are minor and should have no effect on the conclusions reached concerning the environmental impacts.



Norm Faramelli
Director of Planning

NF/er

ERRATA

Corrections to Volume I/Volume II of Final EIR/EIS on Proposed Development at Bird Island Flats

The corrections are of three types --

- I. Some typos and syntactical changes.
- II. Numerical errors that do not affect any of the results presented in the Final EIR/EIS.
- III. Numerical errors that do affect the results slightly, but do not affect the conclusions drawn from the document.

In no instance did we find any major errors, or errors that changed the results in the Final EIR/EIS in a manner that might affect the conclusions regarding the environmental impacts.

Hence, we are sharing these with you so you will have a corrected document. These corrections should not affect your comments, although you might have detected some of the numerical inconsistencies.

VOLUME I

- p xv J - 16 - add "s" to Aeronautics -
- Mass. Aeronautics Commission
- p S - in Table S - 1 - Forecast Demand for 1987 is 288,000 tons not
228,000.
- p EP-4 - line 5 - "Busch" not "Bush"
- p 1-4 - in Table 1.3 - 2 - Forecast Demand for 1987 is 288,000 not 228,000.
- p 4 - 59 On line 10 in 2nd full paragraph under 4.7.1, delete comma after Massport.
- p 4-23 - under (3) line 2 - "at Logan" not "it Logan"
- p 4-32 - HC not CO over column on Existing Conditions
- p 4-89 - On line 5 of 4th paragraph "aggravate" not aggravate"
- p 5-2 - One line 6 of 3rd paragraph - "similarly" not "similarly"
- p 5-4 - On first line under ADVERSE IMPACT, "analyses" not "analysis"

VOLUME II

Page

- iii J - 16 - Add "s" to Aeronautics
- vii Table A 3-9 should be "without" GA, not "with"
- xiv SDC 1 - 1 pC-76 "Idle" not "Isle"
- xvi SD - D - 3 - pD -23
last line add "p" in "paper".
- xxiv SD C5 - 4 - pC-36
(NO) not (No)

- Page
A-4 5th line of 1st paragraph under A-2-3 - add a "period" after No. Apron
- A-5 heading should be "Cargo Trucks" not "Trucks" (all truck numbers in EIR refer to cargo trucks, not total trucks to Logan.)
- A-33 Top line - "Mixed Use" not "Mixed Used"
- A-37 On line 1 of 2nd paragraph - "shows" not "shown"
- B-21 line next to bottom of page add "s" to location
- B-25 line 1 of 3rd paragraph - "...street is construction" not "...street in construction". #Figures B.1-8; B.1-9, B.1-10, and B.1-11 are mislabelled. Should be "Proposed Development Plan" not "High Intensity Commercial (B)".
- C-9 On table C.1-2 typo on column labelled "hydrocarbons"
- C-22 Of last two lines of first paragraph under C.1.3.6, change "between the Build alternative" to "among the Build alternatives"
- C-22 Line 6 of 3rd paragraph - "worse" not "worst"
- C-46 Next to last line of third paragraph - change "emission" to "emissions"
- C-65 Under 6th bullet, last two lines should read "T4 class engines - in terms of both delay in implementation and in the specified levels".
- C-66 In line 13 of first paragraph under Carbon Monoxide - should read "mitigating measures" not "mitigating measured"
- C-66 line 1 of 2nd paragraph "effectiveness" (spelling)
- C-70 line next to bottom " - "is" not "in heavily impacted"
- C - 74 line 8 of 3rd paragraph should read "followed by" not "following by".

II - Numerical errors that do not affect results presented in the Final EIR/EIS.

(a) The tables showing the truck traffic volumes used in the Noise and Air Quality Analyses are not correct (Appendix - Volume II). The new tables should replace:

Table SDB - 9 (pB-72)

Table SDB - 10 (pB-73)

Table SDC - 1-13 (pC-105)

In several of the columns shown on the tables in the Final EIR/EIS, the with and without GA numbers were inadvertently reversed. The air pollution and noise impacts, however, were calculated based on the volumes shown on the attached tables, not on those in the Final EIR/EIS.

TABLE SD B-10. AVERAGE DAILY (24-h4) TRUCK VOLUMES SERVING LOGAN.

Total Number of Trucks Entering and Leaving Logan Airport											
BIF Development Alternative (Year 2000)											
Truck Type	Existing Conditions	Original No-Build	Revised No-Build	High-Intensity Cargo		Low-Intensity Cargo		High-Intensity Mixed Use		Proposed Development Plan	
				With GA	Without GA	With GA	Without GA	With GA	Without GA	With GA	Without GA
Light Trucks	3,468	8,534	3,468	9,302	10,449	9,039	8,434	8,924	10,056	7,615	7,615
Medium Trucks	998	2,455	998	2,676	3,020	2,600	2,426	2,583	2,893	2,191	2,191
Heavy Trucks	284	701	295	765	863	743	693	738	827	626	626
Total	4,750	11,690	4,761	12,743	14,332	12,382	11,554	12,245	13,776	10,432	10,432

¹ Divide figures in Table B-10 by two (2) to derive number of trucks entering.

TABLE SD B-9. AVERAGE DAILY (24-hr) TRUCK VOLUMES SERVING BIRD ISLAND FLATS¹

Total Number of Trucks Entering and Departing from BIF											
BIF Development Alternative (Year 2000)											
Truck Type	Existing Conditions	Original No-Build	Revised No-Build	High-Intensity Cargo		Low-Intensity Cargo		High-Intensity Mixed Use		Proposed Development Plan	
				With GA	Without GA	With GA	Without GA	With GA	Without GA	With GA	Without GA
Light Trucks	--	--	--	5,777	6,847	3,689	3,689	4,154	5,225	3,751	3,751
Medium Trucks	--	--	--	2,363	2,801	1,509	1,509	1,698	2,137	1,534	1,534
Heavy Trucks	--	--	--	614	726	391	391	440	554	397	397
Total	--	--	--	8,754	10,374	5,589	5,589	6,292	7,916	5,681	5,682

¹Note: Divide figures in Table B-9 by two (2) to derive number of trucks entering.

TABLE SD.C. 1-13

YEAR 2000 TOTAL DAILY TRUCK MOVEMENTS BY ALTERNATIVE*

Alternative	Two-Way Truck Trips			
	BIF	North Apron	Southwest	Total
No Build	----	9,872	1,412	11,284
Revised No Build	----	3,688	1,100	4,788
High Intensity with GA	8,794	2,436	1,332	12,562
High Intensity without GA	10,494	2,356	1,332	14,182
Low Intensity with GA	5,734	5,136	1,332	12,202
Low Intensity without GA	5,698	4,344	1,332	11,379
Mixed Use with GA	6,302	4,496	1,332	12,120
Mixed Use without GA	7,970	4,438	1,332	13,740
Proposed Development Plan with GA	5,682	3,688	1,332	10,702
Proposed Development Plan without GA	5,682	3,688	1,332	10,702

*Note: The numbers should be divided by two (2) to get the number of vehicles entering.

- (b) The number of total cargo trucks to Logan given in Table A.2-5 through A.2-11 were incorrect. The BIF truck numbers remain as is. (As noted, all truck numbers refer to cargo trucks not total trucks, so the Tables should be relabelled to reflect that).

Based on these differences in the tables, it is clear that the 2000 numbers are identical, and the 1993 numbers are practically the same. The discrepancy for 1987 accounts for changes in the results by 1% or less. The largest changes occur in the 1982 scenario and they will affect the results at some of the receptor points on the staging diagrams (Figures 4.2-6, 4.2-20, 4.2-14, and 4.2-18, - Vol. I) by 3% or less. Those changes, however, will be imperceptible on the staging figures.

Table A2-7

High Intensity Cargo with GA

<u>Year</u>		
82	2984	(1382)
1987	3888	(3329)
1993	4981	(4836)
2000	6371	(6371)

Table A2-5

Low Intensity Cargo with GA

<u>Year</u>		
1982	2895	(1363)
1987	3773	(3282)
1993	4835	(4768)
2000	6191	(6191)

Table A2-8

High Intensity Cargo without GA

<u>Year</u>		
1982	3359	(1561)
1987	4378	(3758)
1993	5608	(5461)
2000	7191	(7191)

Table A2-6

Low Intensity Cargo without GA

<u>Year</u>		
1982	2696	(1251)
1987	3514	(3014)
1993	4500	(4379)
2000	5777	(5777)

Table A2-9

Mixed Use with GA

<u>Year</u>		
1982	2873	(1333)
1987	3744	(3212)
1993	4797	(4666)
2000	6150	(6150)

Table A2-10

Mixed Use without GA

<u>Year</u>		
1982	3227	(1511)
1987	4205	(3641)
1993	5387	(5290)
2000	6888	(6888)

Table A2-11

Proposed Development (with & without GA)

<u>Year</u>		
1982	2431	(1148)
1987	3168	(2765)
1993	4059	(4018)
2000	5216	(5216)

Numerical errors that do affect the results slightly, but do not affect the conclusions drawn from the document.

CHANGES IN AIR QUALITY SECTION

The air pollution emissions for the Revised No-Build in Final EIR were based on a higher truck volume on North Apron than would actually occur (around 3700 instead of 7900 daily truck movements)*. The isopleths in the Final EIR/EIS do not change, but the total emissions change slightly for CO, and almost imperceptibly, for NOx, HC and TSP.

Please note these changes in Volume I and Volume II

In Table S-4 (Volume I - p5-17),

Table 4.2-3 (Volume I - p4-28) and Table C. 1-3 (pC-17, Volume II)

The new numbers should be :

% Changes in Total Airport Emissions When Compared with the Revised No-Build

	CO	NOx	HC	TSP
(WGA on BIF)				
High Intensity Cargo	+6.0	+2.7	+1.8	+3.9
Low Intensity Cargo	+6.4	+3.0	+2.1	+4.4
Mixed Use/High Intensity Cargo	+7.0	+3.0	+2.1	+4.4
Proposed Development Plan	+6.9	+3.1	+2.6	+4.7

Note that NOx, HC, and TSP are virtually unchanged. The largest increment-
CO- increased from:

<u>Alternatives/In Final EIR/EIS</u>		<u>New Calculations</u>
High Intensity	+ 5.1%	+6.0%
Low Intensity	+ 5.5%	+6.4%
Mixed Use	+ 6.1%	+7.0%
Proposed Development Plan	+6.0%	+6.9%

* That is, the the truck numbers were not only inflated as were all the truck numbers used in the Draft and Final EIR/EIS, but they were high by around a factor of 2 compared to other numbers used in the report.

There are also slight changes to be made to the Total Airport Emissions Tables.

Table 4-2-4 Carbon Monoxide (CO) (p4-30-Volume I) and Table C.I-4 (pC-20, Volume II).

<u>Kg/D</u>	<u>Under Revised No-Build</u>	
	<u>In FEIR/EIS</u>	<u>New Numbers</u>
Trucks	249	131
Total Non-Aircraft	6180	6060
Total Airport	14,640	14,520
TOTAL	19,490	19,370

Table 4.2.5 Hydrocarbons (HC) (p4-32-Volume I) and Table C.I-7 (pC-21, Volume II)

<u>Kg/D</u>	<u>Under Revised No-Build</u>	
	<u>In FEIR/EIS</u>	<u>New Numbers</u>
Trucks	18	9
Non Aircraft	4,000	3,991
Total Airport	6,280	6,271
TOTAL	6,810	6,801

Table 4.2.7 - Oxides of Nitrogen (NOx) (p4-34-Volume I) and Table C-I-5 (pC-19, Volume II)

<u>Kg/D</u>	<u>Under Revised No-Build</u>	
	<u>FEIR/EIS</u>	<u>New Numbers</u>
Trucks	22	12
Total Non Aircraft	523	513
Total Airport	8,430	8,420
TOTAL	8,890	8,880

Table 4.2-8 Total Suspended Particulates (TSP) (p4-37-Volume I) and Table C.I-16) (pC-20, Volume II)

<u>Kg/D</u>	<u>Under Revised No-Build</u>	
	<u>in FEIR/EIS</u>	<u>New Numbers</u>
Trucks	3.0	1.6
Total Non-Aircraft	60.2	58.8
Total Airport	361	360
TOTAL	383	382

These changes should not however affect the conclusions drawn from the document.

The % changes in Table S-4, Table 4.2-3, Table C.I-3 will have to be incorporated into the text of both Volume I and Appendix C-I in Volume II. (see attached pages)

6.0
7.0
Carbon Monoxide Levels in 2000 - CO levels are expected to decline appreciably over the next 20 years because of the Federal Motor Vehicle Control Program (FMVCP) which sets stringent auto emission standards. As noted in Table 4.2-3, the CO increases of the Build alternatives range from 2.7% to 3.6% over the original No-Build, and from ~~2.1% to 3.1%~~ over the Revised No-Build. Despite these slight increases due to BIF development, CO concentrations will be substantially lower in the Year 2000 than they are at present no matter which alternative is selected (see Figures 4.2-3, 4.2-4 and 4.2-5). No violations of the 1 hour or 8 hour standards are expected with any of the development alternatives at any sensitive receptor points in the community, but there might be a violation of the 8 hour CO standard at the terminals and parking garages.

The CO hot spot problem identified in the DEIR for the High Intensity with Mixed Use Alternative is eliminated in the Proposed Development Plan, because the office space is divided between the buffer zone and the southwest corner of BIF rather than being concentrated only in the southwest corner. As a result, CO concentration from traffic congestion and parking is reduced.

Staging

Estimates of the ambient CO concentrations for various points near Logan are made for 1982, 1987, 1993, and 2000. For illustrative purposes, only the No-Build alternative and the Build alternative with GA on BIF are considered. (The differences in concentrations between with and without GA are insignificant).

An examination of Figure 4.2-6 suggests that at every receptor location, CO is expected to decrease with time through the early 1990's, because of the effects of the FMVCP. After about 1993, the benefits of the FMVCP are outweighed by continuing increases in both aircraft and auto activities and predicted maximum CO concentrations begin to rise. With the possible exception of the receptor located at the Hilton Hotel, no violation of either the 1 hour or the 8 hour CO standard is found in this examination.

assess the impact of Logan Airport operations on particulate related health hazards in East Boston. The impact assessment is therefore made only on the basis of total suspended particulates (TSP).

Table 4.2-11 shows the estimated particulate emissions for existing conditions and all project alternatives in Year 2000. Compared with existing conditions, there is an anticipated decrease in the 24 hour emissions ranging from 25% to 29%. This decrease is attributed primarily to an anticipated reduction in aircraft emissions. The difference between the alternative with the highest emissions potential (the Proposed Development Plan with GA on BIF) and the alternative with the lowest emissions potential (the Revised No-Build) is very small - ~~18~~ ²⁰ kg/day or 5%. ✓

Maximum 24 hour TSP concentrations were estimated using procedures described in Appendix C. The results for existing conditions, the No-Build, and all of the Build alternatives in Year 2000 are exhibited in Table 4.2-12 for a number of receptor locations. In the North Apron area, the existing 0.069 (mg/m³) concentration is projected to increase between 0.094 and 0.108 mg/m³. At the Van Dusen Building and at Bird Island Flats, the highest 24 hour TSP concentrations are predicted for High Intensity with Mixed Use and the Proposed Development Plan, while the lowest concentration is predicted for the No-Build. At a receptor on Gove Street, which is heavily impacted by the emissions from tunnel traffic, the estimated maximum 24 hour TSP concentration for High Intensity with Mixed Use and the Proposed Development Plan is 0.095 mg/m³. No exceedance of the primary standard of 0.26 mg/m³ is found anywhere in the airport or in the community. The maximum estimated TSP concentration of 0.095 mg/m³ is less than 40% of the primary standard and is still under the secondary standard.

TSP impacts can result during construction to fugitive dust emissions from grading and filling. The extent of this impact was described in Section 4.2.4. For a more extensive discussion of this subject, see Appendix C.

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TABLE 4.2-11
ESTIMATED PARTICULATE EMISSIONS (IN KILOGRAMS)
IN A 24-HR PERIOD FOR SOURCES AT LOGAN AIRPORT
AND ITS IMMEDIATE VICINITY

Source Categories	Existing	Year 2000					Proposed Development Plan
		Original No-Build	Revised No-Build	High Intensity Cargo	Low Intensity Cargo	Mixed Use	
Total Aircraft	485	310	301	309	309	309	310
Non-Aircraft Sources	39	61	60 59	65	67	68	68
Total Airport	524	371	361 360	374	376	377	378
Surrounding Automobiles	16	22	22	22	22	24	24
TOTAL	540	393	383 382	396	398	401	402

4.4.4.1 Vol. I

For NO_x, however, an overall deterioration is predicted at all receptor locations examined. This is evident by comparing the Year 2000 results shown in Figure C.1-9 with the baseline conditions shown in Figure C.1-4. This deterioration is attributed to an increase in activity, a shift in the aircraft fleet mix toward the wide-bodied jets with more efficient engines that have higher NO_x emissions potential, and an anticipated relaxation and/or delay in NO_x emission regulations for gas turbine engines. Maximum 1-hr NO₂ concentrations at receptor points in proximity to the Airport are estimated at about 0.8 mg/m³, which is within the range of the proposed standard of 0.47 to 0.94 mg/m³.

Maximum 24-hr TSP concentrations at Logan Airport and vicinity in Year 2000 are exhibited in Figure C.1-10. Compared with the existing conditions, this is an overall deterioration at all receptor locations examined. This deterioration is attributed to the projected increase in both aircraft and motor vehicle activities and the absence of any mandated emissions limitations on exhaust particulates. No exceedance of the standard of 0.26 mg/m³, however, is found anywhere at the Airport or its vicinity.

Areawide distribution of maximum 1-hr HC concentrations is illustrated in Figure C.1-11. Compared with the existing conditions, there is a slight overall improvement - especially in the communities where ambient HC concentration are more impacted by automobile sources that are expected to show a reduction in HC emissions as a result of the FMVCP.

C.1.3.2 Revised No-Build

The Revised No-Build Alternative will result in a small reduction in cargo operations and in truck traffic. Table C.1-3 to C.1-7 show the estimated 24-hr emissions of CO, NO_x, particulates, and HC from various sources for each of the project alternatives in Year 2000. Compared to the No-Build, the Revised No-Build will result in 3% less CO emissions from the aircraft sources and 2% 30% less for all airport sources. Similar reductions are observed for NO_x, particulates, and HC emissions.

Area-wide distributions of maximum 1-hr CO, 1-hr NO_x, 24-hr TSP, and 1-hr HC concentrations are shown, respectively, in Figures C.1-12, C.1-13, C.1-14, and C.1-15. The distribution patterns are generally very similar to the corresponding No-Build cases. With the possible exception of the areas surrounding the major air carrier terminals and adjoining parking garages, no exceedance of the 1-hr or the 8-hr CO standard is found. At these terminal and garage locations, exceedance of the 8-hr standard of 10 ppm is anticipated. Similar to the No-Build case, NO₂ will continue to be a potential problem. For TSP, no exceedance of the 24-hr standard is found anywhere. For HC, the concentration isopleths shown in Figure C.1-15 reveal two areas of relatively high 1-hr concentrations - one at the main air carrier terminal and the other at the North Apron. The distribution echoes the HC isopleths that characterize the No-Build condition.

C.1.3.3 High-Intensity Cargo

The proposed High-Intensity alternative with GA will result in increase of about 2.7% CO, 0.4% NO_x, 0.8 particulates, and 0.3% HC in total Airport emissions when compared with the No-Build. When compared with the Revised No-Build situation, the increases in the total airport emissions are 5.1% CO, 2.4% NO_x, 3.3% particulates, and 1.5% HC (see Table C.1-3). Truck emissions are estimated to increase dramatically, but since truck emissions represent only 2 to 5% of total Airport emissions, the net impact is quite small.

Area-wide distribution of maximum 1-hr concentrations of CO, NO_x, and HC are illustrated in Figures C.1-16, C.1-17, and C.1-19, respectively. The maximum 24-hr TSP concentrations are shown in Figure C.1-18. Compared with the No-Build, the proposed High-Intensity Cargo with GA is estimated to result in an increase of about 2% in ambient NO_x concentrations and 30% HC concentrations at Jeffries Point, and a decrease of about 9% NO_x and 30% HC over the Chelsea/Putnam Streets section of East Boston. Potential exceedance of the 8-hr CO standard similar to all alternatives examined is predicted for the area encompassing the main carrier terminals and adjoining garages. The potential NO₂ problem that is suggested by the modeling results for the No-Build and the Revised No-Build will continue with this alternative.

C.1.3.4 Low-Intensity Cargo

The Low-Intensity Cargo Alternative with GA at BIF will result in an increase of about 3.1% CO, 0.7% NO_x, 1.3%

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particulates, and 0.6% HC emissions from all Airport sources, when compared with the No-Build situation. These percentage increases become even more pronounced when the emissions from the Low-Intensity Alternative are compared with the Revised No-Build, viz: ~~4.5%~~ 5.7% for CO, ~~0.2%~~ 0.8% for NO_x, ~~4.4%~~ 4.4% for particulates, and ~~1.9%~~ 2.9% for HC. Compared with the other construction alternatives, the High-Intensity Cargo will result in the least impact (see Table C.1-3).

Area-wide distribution of maximum 1-hr CO, 1-hr NO_x, 24-hr TSP, and 1-hr HC concentrations are shown in Figures C.1-20, C.1-21, C.1-22, and C.1-23, respectively. The distribution patterns of these isopleths are very similar to the corresponding High-Intensity Cargo cases, except that ambient air quality at Jeffries Point with the Light-Intensity Alternative is generally better. For example, maximum 1-hr CO and NO_x concentrations with the Light-Intensity case are respectively 3% and 2% less than the corresponding estimates with the High-Intensity case. Similar to all alternatives examined, this alternative will result in a potential exceedance of the 8-hr CO standard at the main carrier terminals and garages, and a potential NO₂ problem. No exceedance of any other standards is found anywhere in the Airport or its vicinity.

C.1.3.5 Mixed-Use Alternative

Compared with the Low-Intensity and the High-Intensity cargo alternatives, the Mixed-Use Alternative will generally result in greater impact because of the projected increase in vehicle trips to and from BIF. These additional trips are generated as a result of the proposed mixed-use development.

An examination of the emissions inventories shown in Tables C.1-3 through C.1-7 suggests that, when compared with the No-Build, increases of 3.7 CO, 0.7% NO_x, 1.6% particulates, and 0.7% HC in total Airport emissions are anticipated. When compared with the Revised No-Build situation, the increases are ~~0.1%~~ 0.1% CO, ~~0.2%~~ 0.2% NO_x, ~~4.7%~~ 4.7% particulates, and ~~2.1%~~ 2.1% HC (see Table C.1-3).

Area-wide distributions of maximum 1-hr CO, 1-hr NO_x, 24-hr TSP, and 1-hr HC concentrations are exhibited, respectively, in Figures C.1-24, C.1-25, C.1-26 and C.1-27. The distribution patterns are generally very similar to the corresponding high-intensity cargo cases, except that ambient air quality at BIF itself is generally worse with the mixed-use alternative.

Similar to all the other alternatives considered, predicted maximum 8-hr CO concentrations that are very close to the 10 mg/m³ standard are anticipated at most of the air carrier terminals and parking garages. Also, like the No-Build alternatives, NO₂ will continue to be a potential problem. No exceedance of the 24-hr TSP standard is found anywhere at the Airport.

1.3.6 Proposed Development Plan

Emissions inventories for a 24-hr period with the Proposed Development Plan, (with and without GA activity at BIF), are exhibited in Tables C.1-4 for CO, C.1-5 for NO_x, C.1-6 for particulates, and C.1-7 for HC. Compared with the No-Build, the Proposed Development Plan with GA is expected to result in an increase of 3.6% CO, 0.9% NO_x, 0.9% particulates, and 1.1% HC in total Airport emissions. Compared with the Revised No-Build Alternative, these increases are 4.6% CO, 3.9% NO_x, 4.7% particulates, and 2.4% HC. Compared with the other alternatives, the Proposed Development Plan (with or without GA) will result in the heaviest impact, but the differences between the Build alternative are very small (see Table C.1-3).

Area-wide distributions of maximum 1-hr CO, 1-hr NO_x, 1-hr TSP, and 1-hr HC concentrations are shown in Figures C.1-28, C.1-29, C.1-30, and C.1-31, respectively. The distribution patterns are generally very similar to the corresponding Mixed Use Alternative cases, except that ambient air quality at BIF itself is generally worst with this alternative. For example, the maximum 1-hr CO and NO_x concentrations for the Proposed Development Plan are respectively under 14% and 2% higher at BIF than the corresponding estimates about the Mixed Use Alternative. Potential exceedance of the 8-hr CO standard is found only in the area encompassing the main carrier terminals and adjoining garages. The potential NO₂ problem that is suggested by the modeling analysis of the other alternatives is also present with the Proposed Development Plan. No exceedance of the 24-hr TSP standard is found anywhere in the Airport and vicinity.

1.4 Construction and Staging Impacts

• Construction Impact

The impact from construction is assessed both from the standpoint of direct emissions resulting from construction equipment and from fugitive dust emissions.

THE U.S. AIR FORCE AND THE AIR FORCE

Year 2000

Source Categories	Existing	No-Build	Revised No-Build	High Intensity	Low Intensity	Mixed Use	Proposed Development Plan
Total Aircraft	485	310	301	309	309	309	310
Nonaircraft Sources	39	61	57 40	65	67	68	68
Total Airport	524	371	360 361	374	376	371	378
Surrounding Automobiles	16	22	22	22	22	24	24
TOTAL	540	393	382 383	396	398	401	402

Vol II

APPENDIX A-2 - Exchange of Letters
Between Massport and MEPA sent to
Reviewers of FEIR (Jan. 26, 1981)

MASSACHUSETTS PORT AUTHORITY

TO: Reviewer of the Final EIR on Bird Island Flats
FROM: Norman Faramelli
DATE: January 26, 1981
SUBJECT: Additional Correspondence on BIF

On January 16, 1981 we sent you an errata sheet to the Final EIR/EIS regarding the proposed development of Bird Island Flats.

In addition to the comments, we call your attention to another correction that should be noted. In Volume I on nS - 1R (line 7 under (d)) and p4 - 89 (line 4 of 2nd paragraph) a range of traffic increases from 150-250% is noted. That range is incorrect. The highest forecast used in the EIR was 150%, so delete the 250%. (The 250% corresponds to previous estimates not used in the EIR).

During the comment and review periods Massport and MEPA have been in close communication. Enclosed are three attachments:

1. Attachment A - letter from MEPA to Massport (January 5, 1981) regarding traffic information.
2. Attachment B - Massport response to A (January 14, 1981).
3. Attachment C - Massport letter to MEPA (January 22, 1981) setting forth the queueing assumptions used in modelling the air quality impacts of tunnel traffic, and also some data on the traffic flows in the existing tunnels.

The review period on the Final EIR has been extended to February 13, 1981 to allow for your review of the errata sheet and this additional information.

These letters and supplementary information deal with clarifications only. They do not materially affect the results presented in the Final EIR nor the conclusions regarding the environmental impacts.



Norman Faramelli
Director, Planning

NF/er
enclosures (3)



Attachment A
The Commonwealth of Massachusetts
Executive Office of Environmental Affairs
100 Cambridge Street
Boston, Massachusetts 02202

EDWARD J. KING
GOVERNOR

JOHN A. BEWICK
SECRETARY

January 5, 1981

Mr. Norman J. Faramelli
Director of Planning
Massport
99 High Street
Boston, MA

Dear Mr. Faramelli:

RE: Bird Island Flats Final EIR, EOEI No. 03587

In our review of the Final EIR for Bird Island Flats two members of the MEPA staff have identified potential problems in the traffic counts presented. These problems could be major since the conclusions of both the noise analysis and air quality projections depend on the traffic levels analysed.

A. The EIR contains the following information:

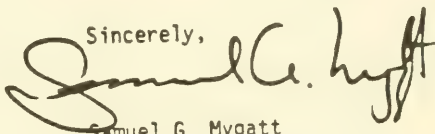
1. Total Logan truck traffic by actual count - 3343 for April 1979 (Page A-22).
 2. Projected total Logan truck traffic for 1982 - for all build options - 1148 to 1511 (Page A12-18). (Approximately 50% of 1979 levels)
 3. Total Logan truck traffic for 1982 - no build options - 2019 to 4440 (Page A19-20).
 4. By the year 2000 the 1982 projections have increased by a factor of approximately 4 times; but by comparison to the actual 1979 data the growth factor is only 2 times.
 5. Table A-2-1 (Page A-5) indicates no automobile traffic due to cargo operations yet Page A-7 states that .0022 cars enter each day per ton of freight handled in a year. (See also table A-2-3 Page A-9)
- B. We are unable to resolve the contradictions in the above. In addition, we note the following:

Mr. Norman Faramelli
RE: Bird Island Flats Final EIR
Page 2

1. Most of the tables in Appendix A do not include a column for existing conditions.
2. A number of small errors appear to be present such as (a) reversed columns on Page A-43, (b) slightly different figures on Page A-43 from those on Pages A-12 through A-18, (c) the truck volume on Page B-72 and B-73 are not the total of BIF and north Apron from Pages B-16 and B-17.

Can we meet with you (and your consultants if you wish) to clarify the above discrepancies on Thursday, January 8, 1981, at our office? We feel this must be resolved before we can properly evaluate the noise and air quality projections which were based presumably on a particular set of existing and projected traffic figures.

Sincerely,

A handwritten signature in dark ink, appearing to read "Samuel G. Mygatt", written in a cursive style.

Samuel G. Mygatt
Executive Director
Environmental Impact Review

SGM:DES:jc



massport

80 HIGH ST. BOSTON, MASSACHUSETTS 02110 (617) 482 2830 TELEEX 84-0365

Attachment B

January 14, 1981

Mr. Sam Mygatt, Director
MEPA Unit
Executive Office of Environmental
Affairs
100 Cambridge Street
Boston, Mass. 02201

Dear Sam:

This letter will confirm the explanations set forth at our meeting last Thursday of the questions contained in your letter of January 5, 1981.

The first four items under Section A of your letter relate to apparent discrepancies between truck volumes reported in the Final EIR as the results of a survey conducted in April 1979, and those presented in a series of phasing tables in Appendix A, pages A12-A19. The first issue, the decrease in truck traffic between the 1979 number and the first year in the phasing tables for each alternative (1982), can be explained by pointing out that the 1979 number is the total of all trucks entering the airport, not just those trucks relating to air cargo, while the 1982 numbers are a projection of the cargo-related trucks only. The second point contained in the first four items is that the growth in cargo trucks between 1982 and the year 2000 amounts to a factor of 4. In the case of BIF-related cargo trucks, this is in line with our assumption that growth on BIF will occur at a greater rate than the North Apron since it is starting from a zero base. Unfortunately, in developing the intervening year projections for the airport as a whole, we erroneously interpolated backwards from the year 2000 projections for the whole airport using the same rate as was used for BIF. As we mentioned to you, we do not see these changes affecting any of our results (see below). Obviously, the North Apron and Southwest cargo areas will continue to grow from their existing volumes at a much lower rate to meet the year 2000 projections.

The last point under Section A in your letter objects to not including auto trips relating to cargo operations in Table A-2-1 on p. A-5. Here again, that Table presents Draft EIR assumptions, which did not include the .0022 cars per day per annual ton developed as part of the trip generation rate corrections undertaken after filing the Draft. These auto trips are included in the Proposed Development Plan and were treated in the sensitivity analyses that were done in order to determine the effects of the inflated generation rates used in the Draft. As you recall, we agreed to continue to use the inflated (Draft EIR) rates for all alternatives in the Final EIR, and to perform sensitivity analysis on the Proposed Development Plan in order to gauge the effect of correct traffic volumes. MEPA was made aware of this in a briefing held after the Draft EIR was filed.

Mr. Sam Mygatt
Page 2

In Section "B" of your letter you note that most of the tables in Appendix A to the Final EIR do not contain a column for existing conditions. However, many of these tables either restate traffic volumes which were used in the Draft EIR, or data used to correct the trip generation rates which were based upon "existing" conditions.

Your final point notes..." a number of small errors ...", slightly different figures presented in different places in the Final EIR, and other minor inconsistencies. While we obviously would prefer to have had none of these problems in the Final EIR, we are pleased that the number and significance of these inconsistencies are truly minor and that they detract in no way from the overall environmental conclusions of the document. The 1993, and 1987 points for all pollutants on the staging figures will remain unchanged, and the changes to 1982 (which are slightly larger) are still imperceptible on the staging figures. Most of the changes are in the order of 1% or less. Even the maximum change (3%) at some receptor points in 1982 cannot be seen on the staging diagrams. Where the changes in traffic does affect the results as in the trucks used in the Revised No-Build case, they have been noted and shared with the reviewers of the document. But those changes in no way affect the conclusions regarding environmental impacts. It should be remembered that any change, for instance, to the 88 kg of CO per day due to trucks has to be compared to the total CO airport emissions of 14,050 kg per day, and to the total CO emissions due to airport, C-I and tunnels of 27,010 kg per day (1978 baseline).

One last item I would like to respond to relates to our discussion at the meeting of the value of and justification for the mixed use portion of our development plan in view of the relatively high trip generation rates associated with those activities, and the existing level of congestion at the tunnels. Although the Secretary has limited authority to judge the value of a proposed project, you are correct in expressing concern over the traffic implications of this portion of the plan. However, you should recognize that the range of land uses available at Logan is limited and that the mixed use area represents a conscious effort on our part to designate airport-related uses in an environmentally sensitive area which do not involve aircraft operation (a feature of earlier schemes), provide an opportunity to offset costs of forwarder activity as an incentive to relocating them from the residential community, and provide a range of employment opportunities beyond the freight warehousing and food preparation service jobs traditionally associated with the airport. In addition, the traffic generated by commercial development will run counter to the tunnel peaks and should present no major tunnel problems.

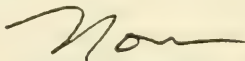
Mr. Sam Mygatt
Page 3

Prior to your forming a final opinion on this matter, I would hope that you will discuss it with East Boston community and the City of Boston both of whom have indicated support for the mixed use area with full awareness of the potential traffic implications, and will discuss this issue further with Massport.

Please do not hesitate to contact me should you require further information regarding this project.

Sincerely,

MASSACHUSETTS PORT AUTHORITY

A handwritten signature in dark ink, appearing to read 'Norm', is positioned above the printed name.

NORMAN FARAMELLI
Director of Planning

NF/er

Attachment C

January 22, 1981

Sam Mygatt, Director
MEPA Unit
Executive Office of Environmental Affairs
100 Cambridge Street
Boston, MA

Dear Sam,

Attached is some additional information regarding the tunnel impacts resulting from commercial development on Bird Island Flats.

(1) A few days ago I gave you the BBN algorithm used to assess tunnel congestion. The data were incomplete, however, since the queueing factor referred to the 1978 base only. A further amplification is included here.

The air quality impacts of the queueing effects were presented in the Final EIR/EIS. From this attached material (Exhibit A) one can derive the actual incremental queueing attributed to commercial development. As you will see, over a 24 hr day, the queueing increases by around 12%, which is the same as the increase in CO that would be experienced over an 8 hr period (see sections in FEIR on Tunnel Impacts). Incidentally, all of the modelling was done based on the Sumner Tunnel, since that was the most acute bottleneck from our standpoint.

(2) In my last letter (Jan. 14), I noted that the traffic flow to and from Logan will run counter to the tunnel peak hour load. The attached tables and charts (Exhibit B) obtained from CTPS, which illustrate tunnel flows, document our contention. The Sumner Tunnel peak is during the morning rush hour, and the Callahan Tunnel, which has been operating under its peak capacity approaches its peak between 4 - 6 p.m.

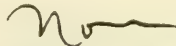
(3) We have done a variety of calculations to estimate the maximum peak hr traffic flow generated by commercial development at Bird Island Flats. That maximum volume amounts to around 600-700 vehicles per hour, which undoubtedly, could be spread out. Incidentally, 600-700 vehicles also represents the amount of underutilized Sumner Tunnel capacity during the evening rush hours due to the egress at the North End/Central Artery.

There are a variety of other issues we want to note to you. In the EIR we considered maximum trip generation rates without taking credits for trip reductions such as:

- many people using the hotel/conference center will not use vehicles on the Logan roadway system,
- some of the vehicles going to the commercial development portion of BIF would still be bound to Logan regardless of BIF development. That is, the location of a business at BIF will often be determined by the need of the business to be near Logan. For example, some of those expressing interest in a BIF office location have made known their need to travel to Logan daily.

We would be willing to discuss these or other aspects with you at your convenience.

Sincerely,



Norman J. Faramelli
Director of Planning

NJF/ly

- Enclosures

Tunnel Impacts

The algorithm used by BBN to model tunnel impacts was as follows:

Estimate 24-hr emissions according to

$$E_{24} = E_{pk-hr} * \bar{a}$$

where \bar{a} (queue factor) = 10.21
(1)

and,

$$E_{pk-hr} \text{ (Kg/hr)} = 42 * \text{Idling Emission Factors (g/veh-minute)} \quad (2)$$

Idling Emission Factors in g/vehicle-minute				
	CO	HC	NO _x	TSP
1978	25.53	1.83	0.30	-**
1979	23.39	1.67	0.33	-
1982	16.22	1.20	0.39	-
1987	8.26	0.74	0.45	-
1993	5.87	0.62	0.46	-
2000	5.67	0.61	0.46	-

** Assumed negligible

(1) (queue factors) for auto emissions at the Sumner Tunnel

Year	Base	No Build Options & Light & Heavy Cargo at BIF	Mixed Use & Proposed Development Plan
1978	10.21		
1982		11.29	12.13
1987		12.64	13.66
1993		13.74	14.96
2000		14.38	16.13

queue factors change by the ratio of total volume to 1978 volume times the base 10.21

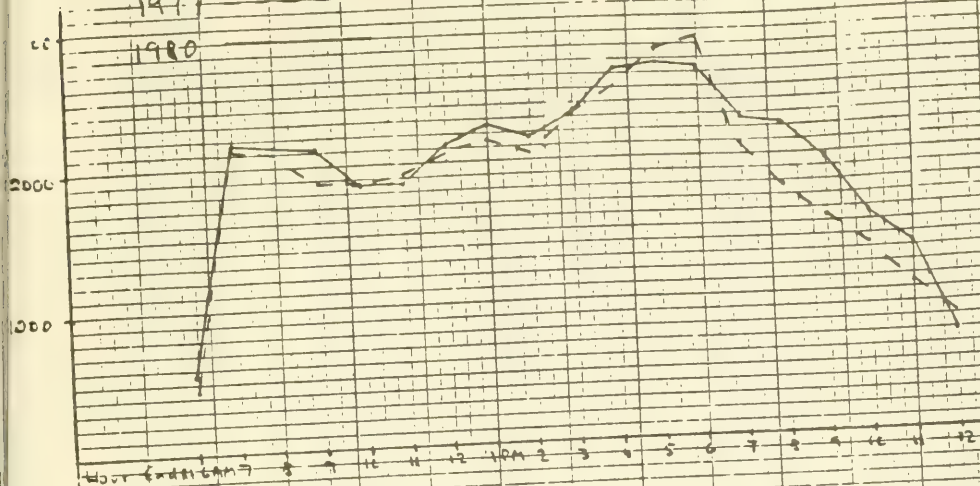
(2) Peak hour emissions = 42 (IEF) - 42 is derived from 700 vehicles^{*} X 60 min/hr X 1 kg/1000 g
^{*}(modelled as a parking lot)

700 vehicles on measured space (12 ft separation distance), from beginning of queue to the back-up ramp. This corresponds to 4 lanes - 2,100 feet long.

Callahan Tunnel

1977

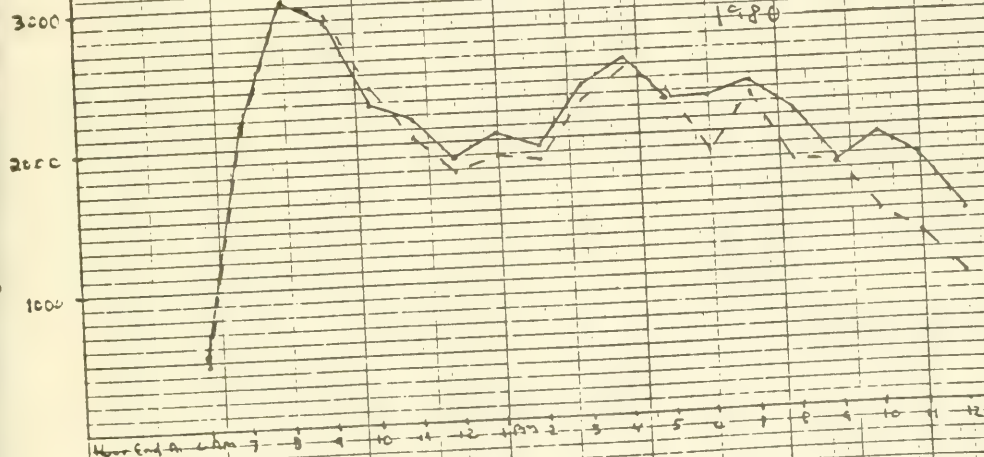
1980



Summer Tunnel

1977

1980



Hourly Traffic Trends for Callahan and Summer Tunnels 1977 and 1980

Exhibit B - 2

Hour	Callahan 1977	Tunnel 1980	Summer 1977	Tunnel 1980
5-6 AM	458	559	476	525
6-7	2130	2171	2115	2177
7-8	2100	2148	3059	3033
8-9	1894	2134	2921	2895
9-10	1886	1853	2400	2276
10-11	1928	1869	2040	2171
11-12	2065	2107	1790	1890
12-1 PM	2158	2266	1897	2041
1-2	2058	2180	1854	1910
2-3	2314	2344	2257	2360
3-4	2507	2643	2487	2541
4-5	2781	2695	2304	2241
5-6	2854	2605	1875	2255
6-7	2094	2270	2267	2347
7-8	1796	2209	1775	2117
8-9	1547	1978	1753	1722
9-10	1332	1557	1397	1457
10-11	1047	1341	1214	1787
11-12	804	700	908	1372
24 Hour Total	37138	39196	38278	41262
1 Average of counts taken on Mon, 12/1/75, Tues, 4/12/77 and Wed, 4/13/77				
2 Average of counts taken Mon - Fri, 4/7/80 - 4/11/80				

Month	Total (1,000's)	Change from 1974 Average	Month	Total (1,000's)	Change From 1974 Average
January, 1973	1709	.93	January, 1976	1931	.94
February	1776	.87	February	1956	.95
March	2059	1.00	March	2161	1.05
April	2039	.99	April	2173	1.06
May	2141	1.04	May	2262	1.10
June	2138	1.04	June	2252	1.10
July	2079	1.01	July	2217	1.08
August	2170	1.06	August	2241	1.09
September	2358	1.15	September	2141	1.04
October	2605	1.27	October	2054	1.10
November	2426	1.17	November	2113	1.03
December	1944	.95	December	2108	1.03
Average, 1973	2135		Average, 1976	2152	
January, 1974	1534	.89	January, 1977	1874	.91
February	1695	.83	February	1878	.92
March	2055	1.01	March	2230	1.09
April	2056	1.00	April	2148	1.05
May	2050	1.08	May	2200	1.07
June	2126	1.07	June	2234	1.09
July	2131	1.04	July	2171	1.06
August	2226	1.09	August	2260	1.10
September	2085	1.02	September	2132	1.04
October	2135	1.04	October	2226	1.09
November	1938	.94	November	2106	1.03
December	2025	.99	December	2106	1.03
Average, 1974	2051		Average, 1977	2131	
January, 1975	1938	.87	January, 1978	1936	.90
February	1749	.85	February	1905	.89
March	2057	1.00	March	2216	1.03
April	2060	1.00	April	2209	1.11
May	2172	1.06	May	2206	1.17
June	2131	1.05	June	2201	1.17
July	2123	1.04	July	2222	1.13
August	2180	1.06	August	2204	1.17
September	2076	1.01	September	2202	1.12
October	2195	1.07	October	2402	1.17
November	2060	.96	November	2257	1.10
December	2074	.98	December	2219	1.10
Average, 1975	2062		Average, 1978	2207	

Exhibit B-X

A-2-14

Appendix A-3 - Letters and memos on
Traffic Impacts transmitted to MEPA
on February 13, 1981.



February 13, 1981

Executive Office of Environmental Affairs
Leverett Saltonstall Building
100 Cambridge St.
Boston, Mass. 02108

Attn: Mr. Samuel Mygatt

Dear Sam:

Attached are three memos submitted to me by consultants to the Authority that further explain the work presented in the FEIR and are intended to clarify some of the concerns raised by you and your staff. For your information, the traffic numbers used in the calculation of the air quality and noise impacts in the FEIR are to be found in Volume II of the FEIR on pages A-5, C-103, and on revised pages A-12 to A-20, B-72-73, and C-105 which were submitted to you on January 16, 1981.

The three memos deal with the following: (A) In Attachment A, Richard Hangen supplies information on traffic flows and congestion, utilizing less conservative trip generation rates and traffic flow data than we used in the FEIR because we there presented a worst case analysis. Hangen's memorandum identifies what we believe to be the most likely impacts. In his memo, Hangen clarifies the volume/capacity ratios to be expected from BIF development and demonstrates that the queuing assumptions used in the FEIR reflect even greater air quality impacts than will be realized; (B) as you will remember from the FEIR, the eight hour CO levels at the tunnels are projected, without application of mitigating measures, to be substantially under the eight hour CO standard set by EPA. As that is the case, the FEIR did not analyze the individual ameliorative impact of each possible further mitigating measure considered. But because you were interested, we asked Gordon Lewin to prepare such a subsidiary analysis. Lewin explains in his memos the effects of various mitigating measures, including flexi-time, on peak hour congestion. The first Lewin memo (Attachment B) explains his methodology and includes his assumptions about employee tunnel use and trip generation factors that are slightly different from those assumptions used by Hangen and regarded by us as most likely.

Executive Office of Environmental Affairs
Attn: Mr. Samuel Mygatt
February 13, 1981
Page 2


The second Lewin memo (Attachment C) recalculates the effects of these mitigating measures on peak hour traffic by using all of the assumptions used by Hangen. For your purposes, Attachments A and C will give you the combined effects of traffic congestion and mitigating measures. The numbers in Attachment B will illustrate the effect slightly different assumptions can have on peak hour traffic projections.

As you will see after reading these attachments, the traffic flows and, obviously, the resultant air quality impacts would be even lower than those shown in the Final EIR. Our air quality consultant will be calculating specific resultant air quality impact reductions based on the attachment numbers.

If you should have any questions, we would be pleased to discuss these confirming results with you and your staff.

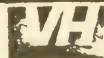
Sincerely,

MASSACHUSETTS PORT AUTHORITY



Norman J. Faramelli
Director of Planning

MEMORANDUM



TO: Mr. Norman Faramelli
Director of Planning
MASSPORT

DATE: 13 February, 1981

REF.: 80-105A

FROM: Vanasse/Hangen Assoc., Inc.

RE.: TRAFFIC ANALYSIS
BIRD ISLAND FLATS

INTRODUCTION:

We are transmitting our analysis of travel impacts created by mixed-use development at Bird Island Flats in response to specific issues raised by a MEPA Staff Report dated January 26, 1981. Our memo provides traffic flow diagrams indicating volumes in 1979, in 1987 without Development, and in 1987 with BIF Development. Tabular summaries of operating conditions currently experienced and those expected with BIF Development are provided. In the following sections of this memo, we have briefly explained our approach, analysis methods, and conclusions, for your transmittal to MEPA.

DATA:

Traffic flow data was obtained from the sources listed in Table 1 and was adjusted to provide a balanced average weekday traffic flow diagram (Fig. 1), using control stations operated by Mass. DPW on Route C-1 and Logan Airport Ramps. Peak hour volumes were also balanced (Fig. 2) on the existing roadway network, using ATR counts from Source #2 and hourly turning movements from Source #8. Both sources provided information obtained in April of 1979.

Traffic flow through the Sumner/Callahan Tunnel and Central Artery was derived from previous reports, existing Mass. Turnpike Authority Counts and City of Boston information.

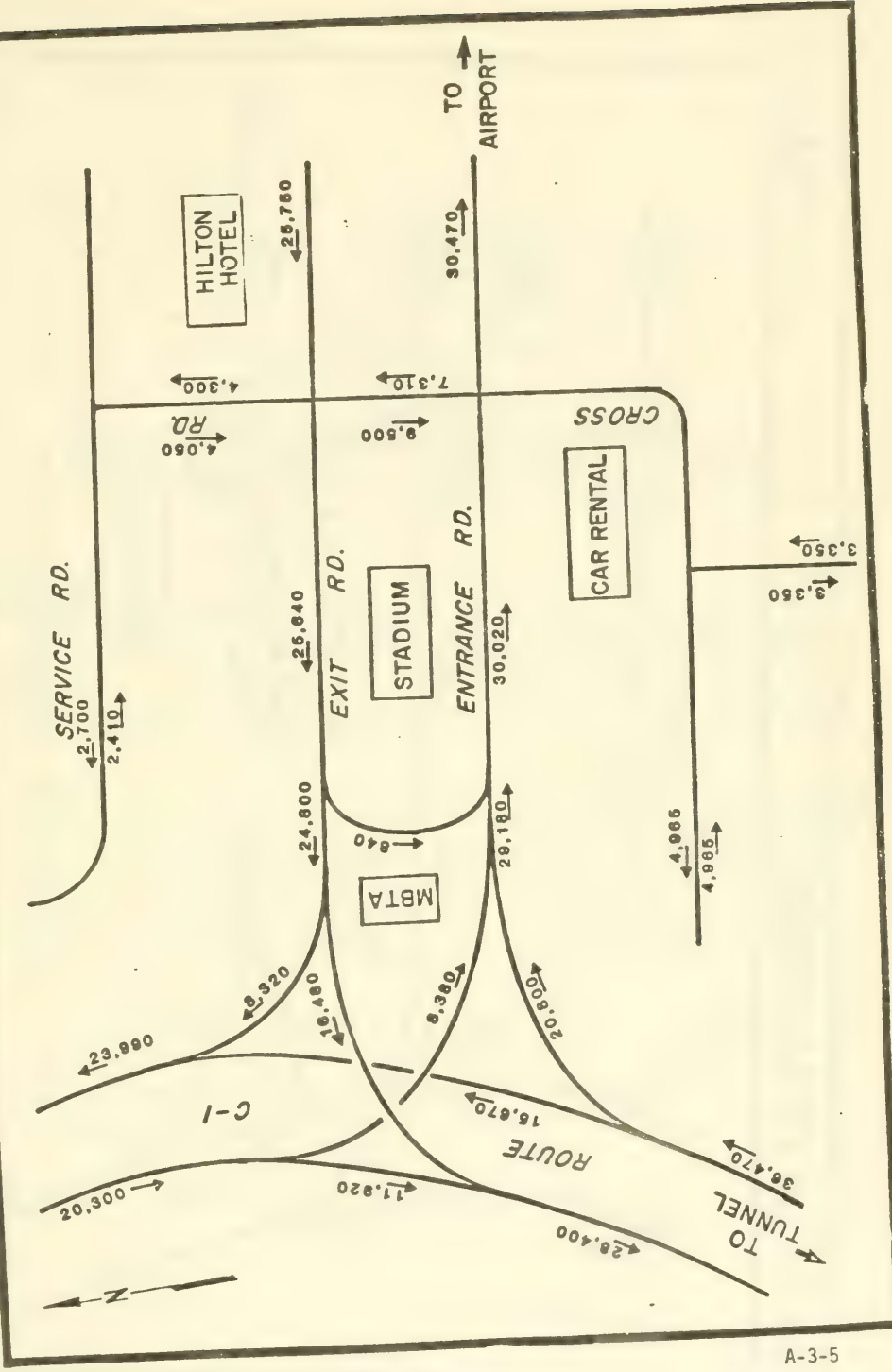
TABLE 1
TRAFFIC COUNTS

SOURCE

- 1) BOSTON-LOGAN INTERNATIONAL AIRPORT
VEHICULAR TRAFFIC SURVEY --
BRYANT ASSOC., INC. AUGUST 1979
- 2) ADJUSTED LOGAN AIRPORT TRAFFIC COUNTS --
CAMBRIDGE SYSTEMATICS, INC. APRIL 5, 1980
- 3) BOSTON CENTRAL ARTERY
1977 ORIGIN/DESTINATION SURVEY --
TIPPETTS-ABBETT-McCARTHY-STRATTON
NOVEMBER 1978
- 4) BOSTON REDEVELOPMENT AUTHORITY
1974 COUNTS @ CENTRAL ARTERY/NORTH STREET
ADJUSTED FOR STATE STREET RAMP CLOSURE
TELECON ALFRED HOWARD FEBRUARY 12, 1981
- 5) MASSACHUSETTS TURNPIKE AUTHORITY
1975-1980 SUMNER/CALLAHAN TUNNEL COUNTS
H. BAKER TELECON FEBRUARY 12, 1981
- 6) MASSPORT
PRINTOUT OF JANUARY 26, 1980 - ADT & HOURLY
FLOWS ON AIRPORT RAMPS & C-1
- 7) SUMNER/CALLAHAN HOURLY FLOWS
1977-1980 -- CTPS
- 8) TURNING MOVEMENT COUNTS AT AIRPORT
SIGNALS COPIED FROM BRYANT ASSOCIATES FIELD
NOTES BY R. SLOANE -- CTPS -- PROVIDED
FEBRUARY 10, 1981

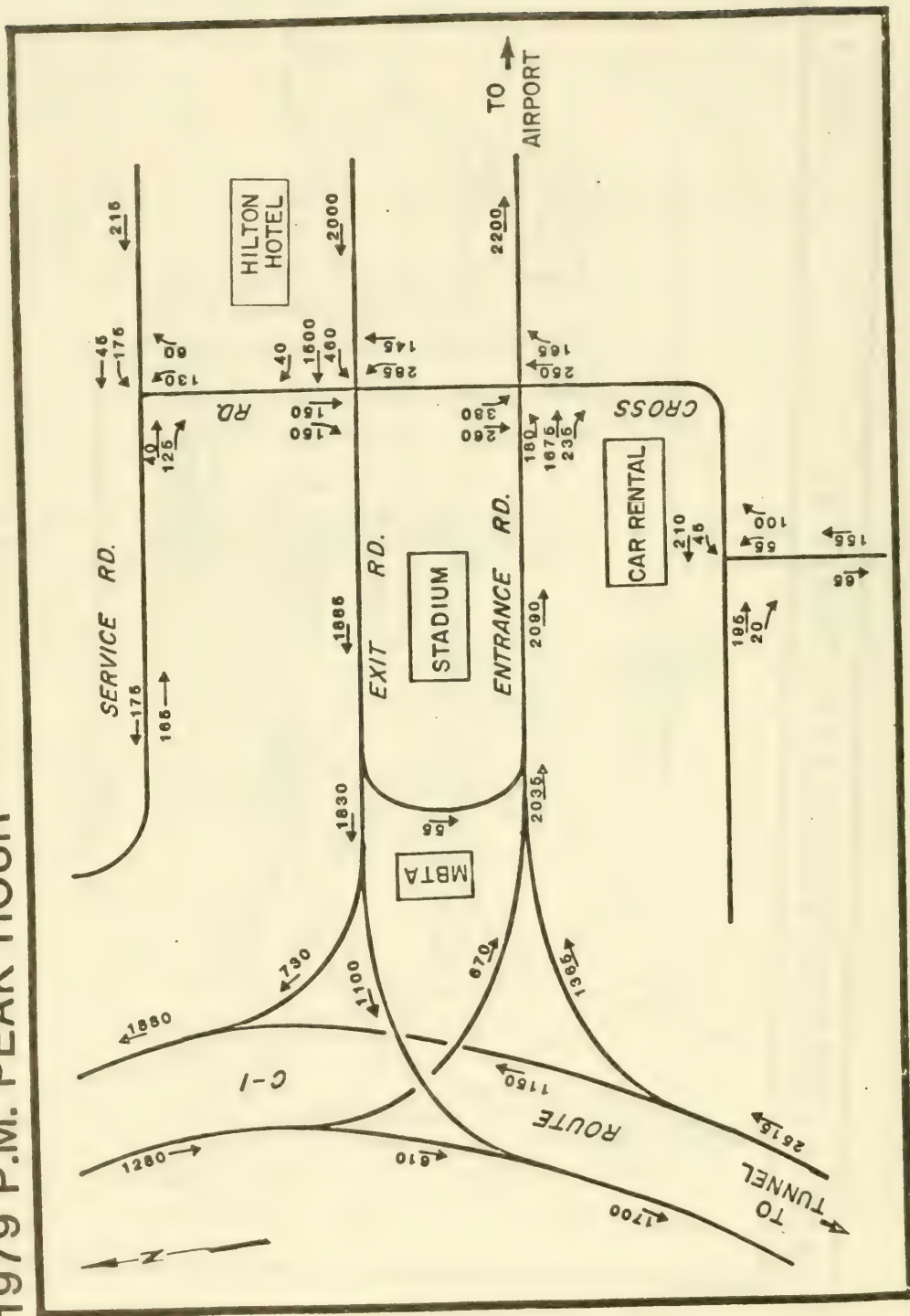
FIG.1

1979 AVERAGE WEEKDAY TRAFFIC



1979 P.M. PEAK HOUR

FIG. 2



Preparation of 1987 Base:

Balanced flow volumes in 1979 were increased on a daily basis by 20% to obtain the 1987 average weekday traffic figures shown in Figure 3. This growth rate was developed on the basis of projected Airport activity growth and includes increased cargo activity as well as passenger enplanements.

Peak hour flow rates were increased by approximately 13% from 1979 to 1987 and are shown on Figure 4. A lower growth rate for peak hour traffic reflects the spreading of peak periods due to capacity restraints of area roadway system.

A review of historical trends reveals the growth factors used in this effort are high -- for example, Airport ramp traffic decreased from 1979 to 1980. However, continued Airport growth is expected to occur and recent trends were discounted (see attached Table 3).

Trip Generation:

New vehicular travel demands created by development of Logan Airport's - Bird Island Flats - were generated from empirical data established by the Institute of Transportation Engineers and data collected by Vanasse/Hangen. A summary of rates is shown in Table 2 for land uses expected as part of the mixed-use Development at BIF.

Truck trips generated by the Air Cargo and Freight Forwarder activity were assumed to be included in the general growth factor applied to existing traffic data. Accordingly, separate generation rates for this activity are not summarized in Table 2.

FIG. 3

1987 AVERAGE WEEKDAY TRIPS

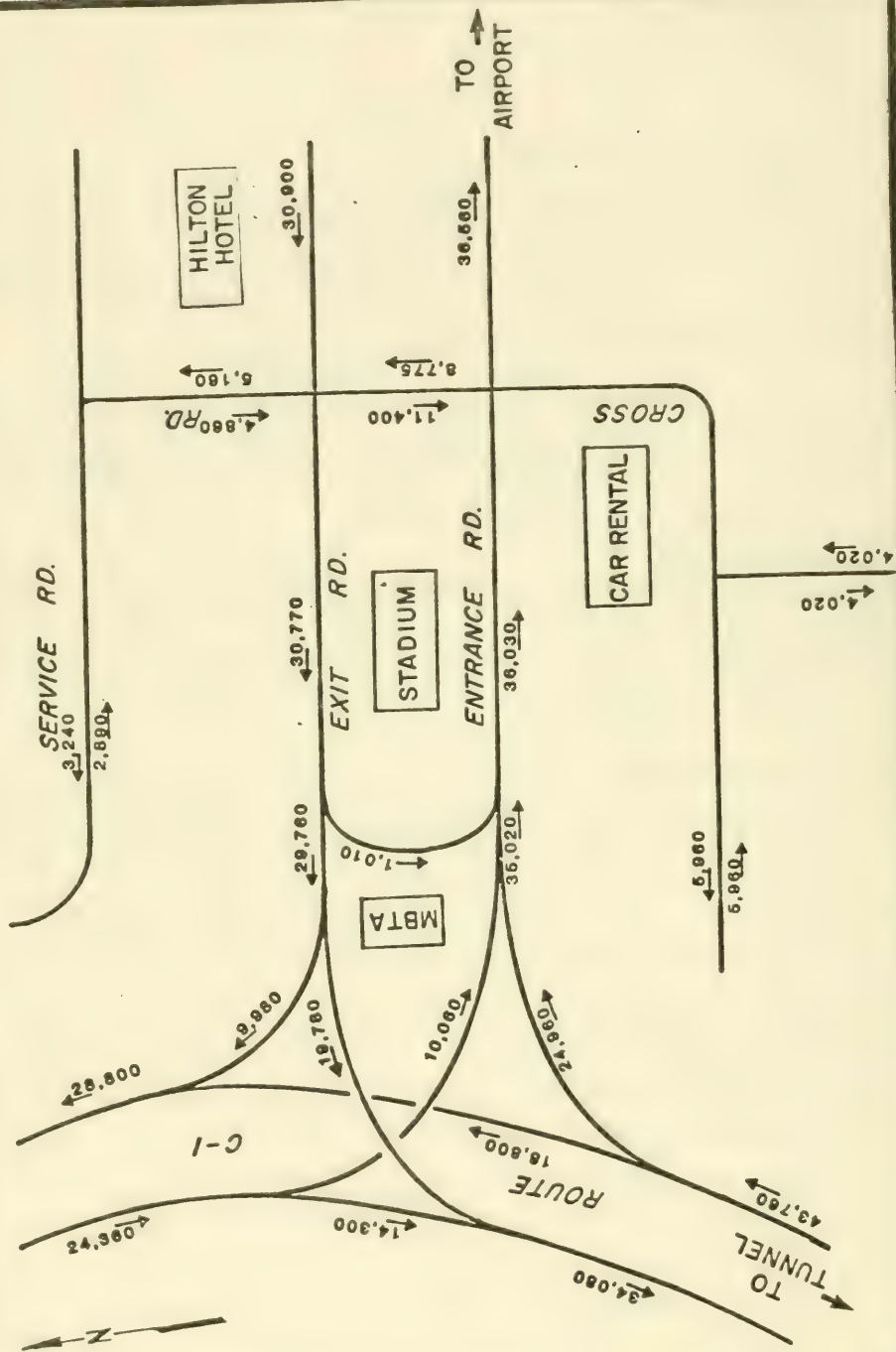


FIG. 4

1987 P.M. PEAK HOUR BASE CONDITION

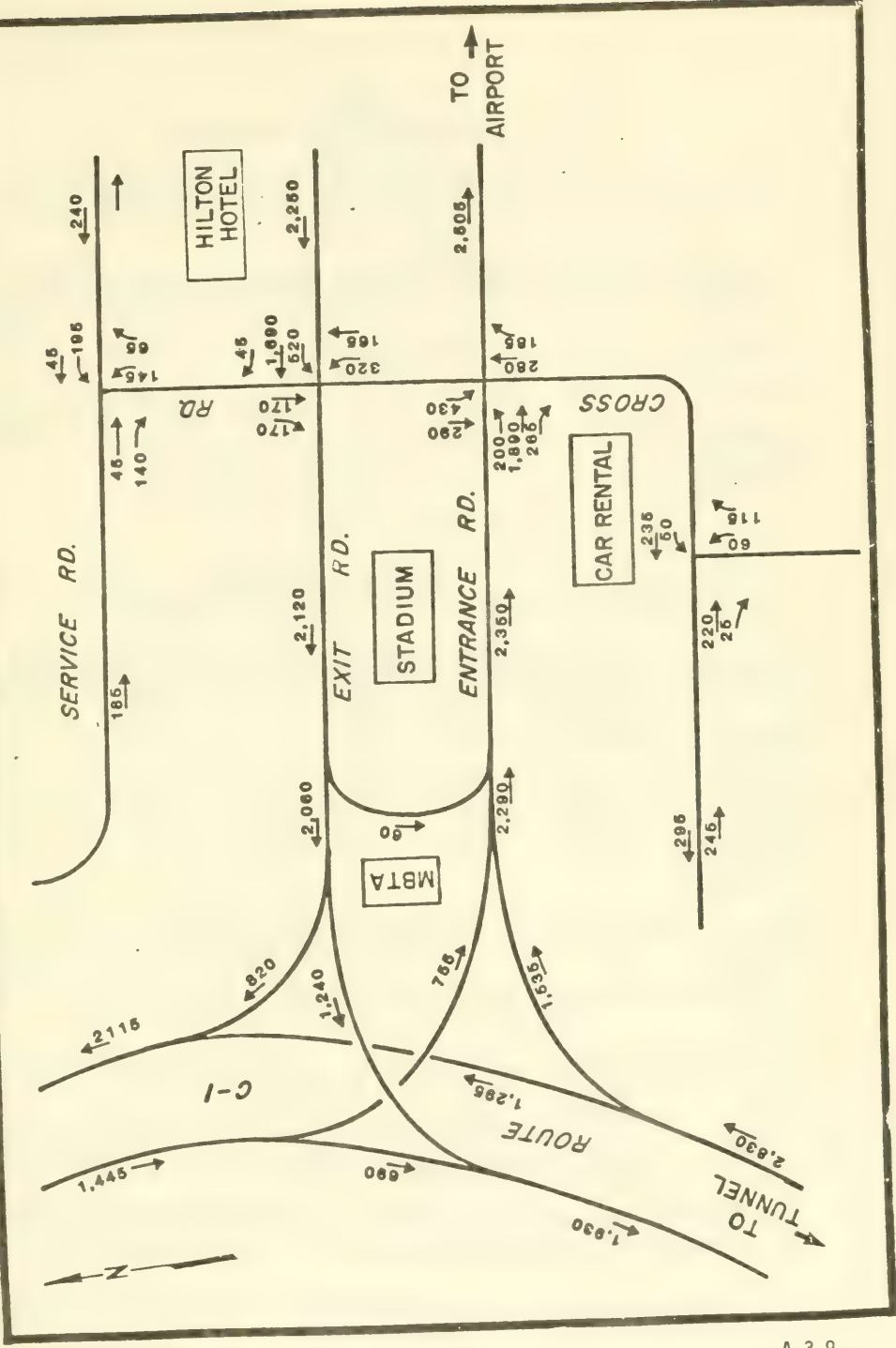


TABLE 2
TRIP GENERATION RATES

PROPOSED LAND USE MIXED-USE AREA

<u>ACTIVITY</u>	<u>AMT</u>	<u>UNIT</u>	<u>ADT TRIP RATE</u>	<u>RATE/UNIT/PM PK HR</u>	
				<u>IN</u>	<u>OUT</u>
Office ^{1/}	500	1000SF	11	0.27	1.36
Hotel ^{2/}	350	Room	8	0.41	0.49
Light ^{3/} Manufac- turing	300	1000SF	4	0.11	0.65

TRIP CALCULATIONS

<u>ACTIVITY</u>	<u>AVERAGE WEEKDAY TRAFFIC</u>			<u>PM PEAK HOUR</u>	
	<u>TOTAL</u>	<u>ENTER</u>	<u>EXIT</u>	<u>ENTER</u>	<u>EXIT</u>
Office	5500	2750	2750	135	680
Hotel	2800	1400	1400	145	170
Light Manufac- turing	1200	600	600	35	195
TOTAL	9500	4750	4750	315	1045

1/ SOURCE WILBUR SMITH & ASSOC. ACCESS ORIENTED PKG STRATEGY--1972
TABLE 20 - DAILY PERSON ARRIVALS/KSF
OFFICE = 7.53
CAR OCCUPANCY--CITY OF BOSTON PK HR CORDON COUNT = 1.4
AUTO ARRIVALS = $7.53 \div 1.4 = 5.38 \times 2 = 10.76$
USE: 11 TWO-WAY

2/ SOURCE VH 1979/1980 SURVEY AT HYATT REGENCY & MARRIOTT, NEWTON

3/ SOURCE ITE INFORMATIONAL REPORT - TRIP GENERATION REV 1979

TABLE 3

AWDT GROWTH FACTOR FOR BASE LINE
1979-1987

AIRPORT TRAFFIC

$$1979 \times 1.2 = 1987$$

SOURCE: MEMO MASSPORT 8/26/80 -- AVIATION FORECAST
A. ENG TO J. BREVARD

ALSO:

SUMNER/CALLAHAN TUNNEL GROWTH

1980 ADT = 75,571

1975 ADT = 67,782

$$F = 1.11 \quad 2\%/Yr.$$

$$@ 8 \text{ years} = 1.17$$

USE 1.20 FOR AWDT FORECAST FROM 1979-1987

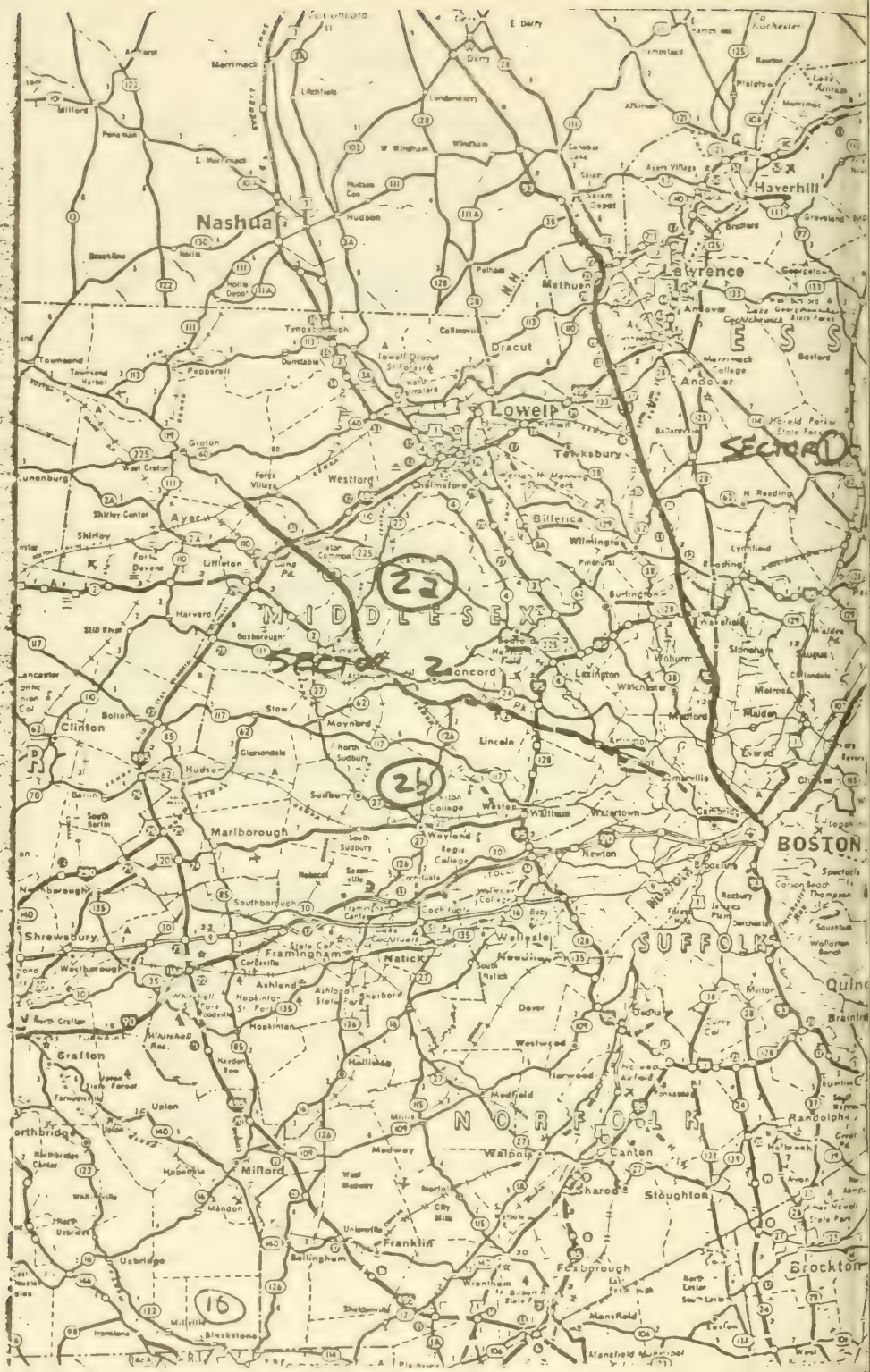
SOURCE: MASSACHUSETTS TURNPIKE AUTHORITY
H. BAKER 2/12/81

PM PK HOUR FLOWS GROWTH 1979-1987

USE 1.5% ANNUAL/8 YEARS
= 1.126

NOTE: COUNTS IN TUNNEL SHOW LITTLE OR NO GROWTH
DURING PEAK PERIODS

COUNTS ON AIRPORT RAMP SHOW DECLINE FROM
1979-1980 DURING PM PEAK PERIOD



Trip Distribution:

New trips created by the BIF mixed-use Development were assigned to the existing roadway system in the following manner. Office and Light Manufacturing trips were assigned in accordance with place of residence of current MASSPORT employees as documented in: Logan Airport Employee Survey by Cambridge Systematics and Bryant Associates, January 1980.

Hotel-generated trips were assumed to be created by Airport activity and Boston CBD. An equal distribution between the two was chosen, as shown in Tables 4 and 5.

The new trips were then assigned to existing roadways, as shown in Figure 5, on the basis of minimum time path between point of origin and destination. Figure 6 shows resulting 1987 PM peak hour traffic flows with full Development of the BIF mixed-use area.

Level of Service Analysis:

Impacts of the proposed BIF Development on existing streets and roadways serving the site were developed through Level of Service analysis. Two critical areas were investigated: (1) The Sumner/Callahan Tunnel Complex and the Tunnel interface with the Central Artery, and (2) The signalized intersections on the Airport entrance/exit roadways. A preliminary analysis of Airport ramp merge and diverge points on Route C-1 indicates no capacity constraints at these locations. In the projected (1987) PM peak hour, it appears all ramp control points are capable of operating at adequate Levels of Service. The Tunnel and Signals are discussed in the following sections of this memo.

TABLE 4
TRIP DISTRIBUTION
PM PEAK HOUR
FOR OFFICE & LT. MANUF. EMPLOYEES

ASSUME TRIP DESTINATION =
SAME DISTRIBUTION AS CURRENT MASSPORT EMPLOYEES:

	PERCENT
SECTOR 1 = 4604 EMPLOYEES	54%
SECTOR 2a = 1516 EMPLOYEES (See Attached	18%
2b = <u>2361</u> Map)	28%
TOTAL = 8481 EMPLOYEES	

SOURCE: LOGAN AIRPORT EMPLOYEE SURVEY -- METHODOLOGY
AND DATA SUMMARIES BY CAMBRIDGE SYSTEMATICS, INC.
AND BRYANT ASSOCIATES, INC. JANUARY 1980

ROUTE FOR SECTOR DESTINATION

SECTOR I = Route 1 and 1A

SECTOR IIa = Route 93 & Rte.-2 North and West

b = Route 93 and Rte.-90 South and West

TABLE 5

TRIP DISTRIBUTION TABLE

PM PEAK HOUR

FROM BIF

USE	TOTAL TRIPS	TO AIRPORT	TO NORTH VIA McCLELLAN	TO NORTH VIA TUNNEL/I-93	TO SOUTH VIA TUNNEL/I-93
Office and Light Manufact- uring	875	0	54% 472	18% 158	28% 245
Hotel	170	50% 85	0%	0%	50% 85

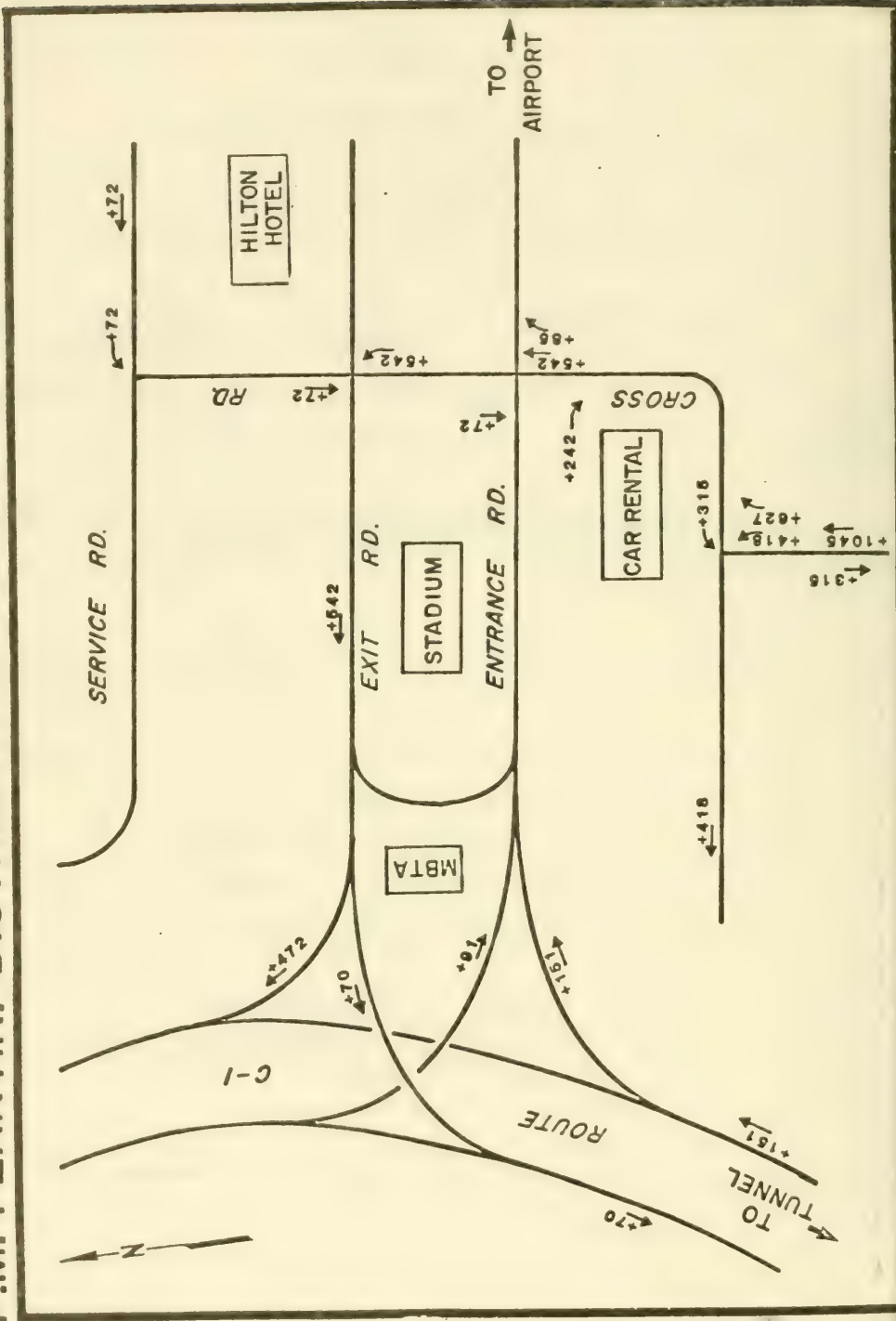
NOTE:

TRIP DISTRIBUTION/GENERATION

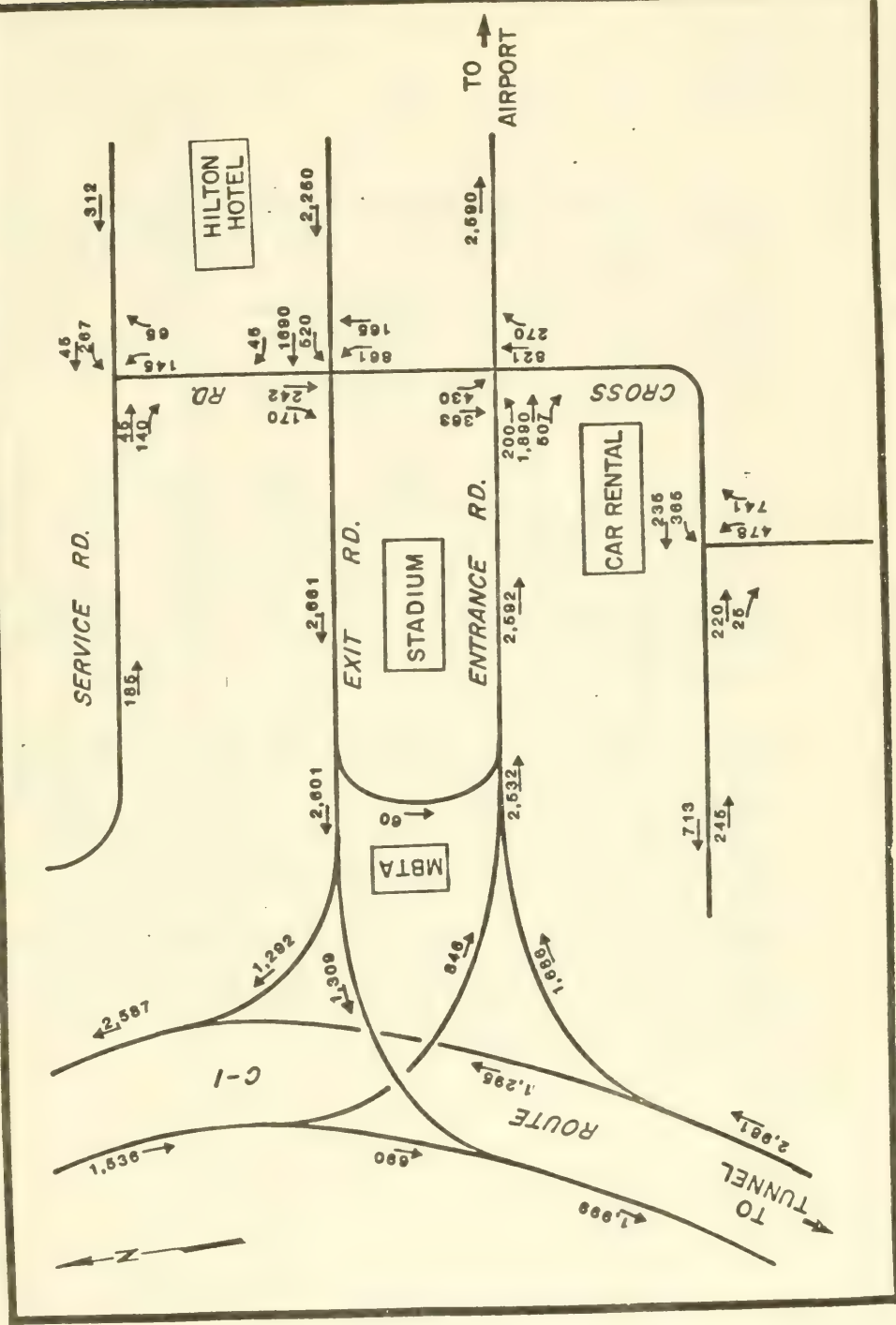
BIF AIR CARGO /FORWARDERS

INCLUDED IN GROWTH FACTOR OF:
1.13 from 1979-1987VOLUMES ARE INCLUDED IN 1987
BASE FLOW DIAGRAM
SINCE THIS IS NOT NEW USE AT
LOGAN

P.M. PEAK HR. DISTRIBUTION-GENERATED TRIPS FIG.5



P.M. PEAK HOUR 1987 WITH DEVELOPMENT FIG.6



The two signalized intersections controlling access to and from Logan are currently operating at Level of Service D during an average weekday peak hour. Capacity, Level of Service E, is reached by 1987 with the No-Build volume condition. Additional traffic created by Bird Island Flats adds volumes that are in excess of current roadway capacities. Table 6 summarizes Level of Service analysis at the intersections.

Capacity of the Sumner Tunnel is the critical element to be investigated on the outward-bound trip from Bird Island Flats. To evaluate impacts of BIF, three constraints on Tunnel capacity were investigated: (1) the Tunnel link capacity; (2) the Pedestrian Signal on the Artery Frontage Road by Hanover Street; and (3) the Central Artery on-ramp merge point with northbound Artery traffic.

Figure 7 shows the 1979, 1987 No-Build, and 1987 Build volumes passing through each of the control points identified above. The capacity of each control point was then calculated (see attached sheets) and forecasted volume/capacity ratios developed. The analysis indicates additional volumes on the Central Artery northbound on-ramp will be above capacity of the merge point. The Pedestrian Signal and Tunnel link can accommodate additional volumes before capacity is reached. However, this is only for southbound-oriented vehicles. Table 7 summarizes volume/capacity ratios expected with BIF Development.

TABLE 6

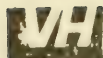
LEVEL OF SERVICE SUMMARY

SIGNALIZED INTERSECTIONS

PM PEAK HOUR

LOCATION	1979 Critical Lane V/C	1987 No-Build Critical Lane V/C	1987 Build Critical Lane V/C	1987 Build Porter St. Closed Critical Lane V/C
Entrance Rd. @ Cross Rd.	1442 0.87	1635 0.99	2002 1.21	2248 1.36
Exit Rd. @ Cross Rd.	1458 0.88	1627 0.99	2287 1.39	2793 1.69

V/C = VOLUME/CAPACITY RATIO



Vanasse / Hangen Engineering, Inc.
Consulting Engineers & Planners
184 High Street, Boston, Massachusetts 02110
17 / 482-1870

JOB: MASSPORT / BIF JOB No. _____
LOCATION: _____ SHEET 4 OF 5
CALCULATED BY WTR DATE 12 FEB 9
CHECKED BY: _____ DATE: _____
TITLE TRAFFIC VOLUMES PM PEAK

FIG. 7

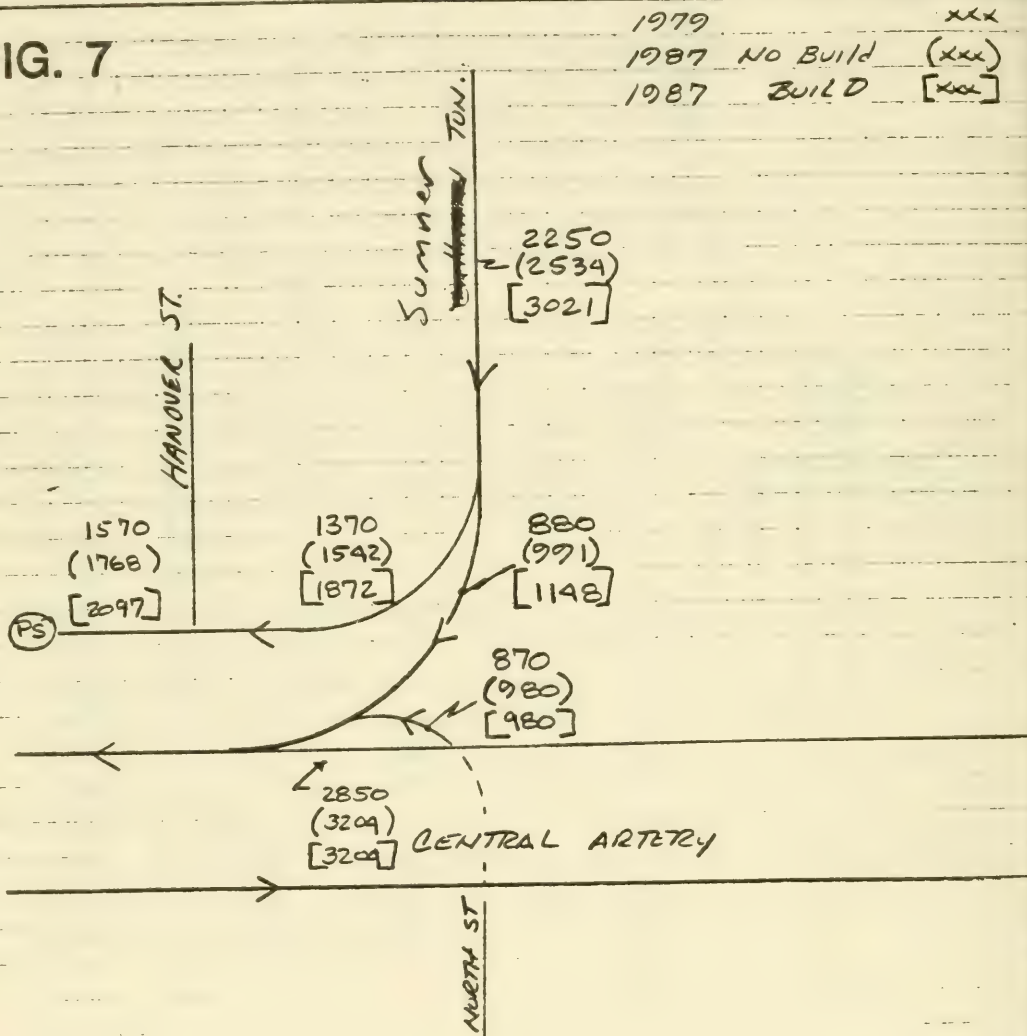


TABLE 7

PM PEAK HOUR
VOLUME/CAPACITY SUMMARY

LOCATION	CAPACITY	V/C RATIOS		
		1979	1987 <u>NO BUILD</u>	1987 <u>BUILD</u>
Tunnel Carleton <i>Summer</i>	3460	.65	.73	.87
Ped. Signal Hanover St.	2000	.79	.88	1.05
Artery Merge	2000	1.01	1.15	1.23

LEVEL OF SERVICE CALCULATIONS

SIGNALIZED INTERSECTIONS ON AIRPORT

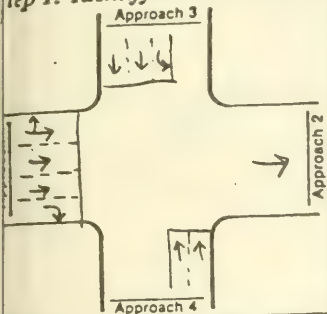
Critical Movement Analysis: OPERATIONS AND DESIGN

Calculation Form 2

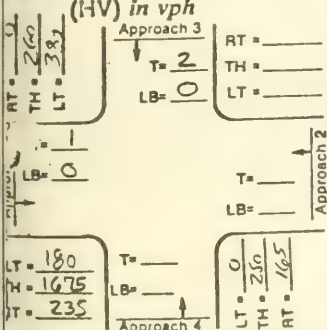
Section Extens Rd & Ans Rd Design Hour PM PK HR - 1979

Problem Statement Rebuild Existing Level of Service

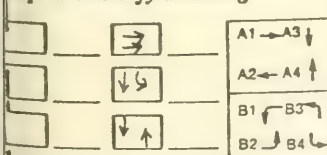
Step 1. Identify Lane Geometry



Step 2. Identify Hourly Volumes (HV) in vph



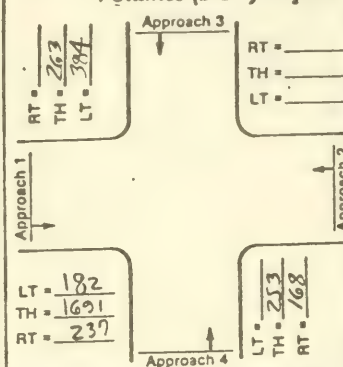
Step 3. Identify Phasing



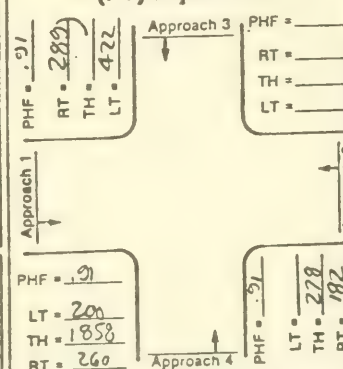
Step 4. Left Turn Check

Approach	1	2	3	4
Number of change intervals per hour				
Left turn capacity per change interval, in vph				
G/C				
Left turning volume, in vph				
Left turning capacity, in vph				
Left turning volume, in vph				
Left turning capacity, in vph				
Left turning volume, in vph				
Left turning capacity, in vph				

Step 5. Develop Passenger Car Volumes (PCV) in pch



Step 6. Calculate Period Volumes (PV) in pch



Step 7. Turn Adjustments

Approach Movement	1	4	3
Turn	LT RT	RT	LT RT
Turn volume (PV from Step 6)	200 260	182	422 200
Opposing vol. in vph from Step 2	-	-	-
Ped. vol./hour	0	0	0
PCE LT from Table 3	1.05	1.05	1.05
LT vol. in pch	210	182	443
PCE RT from Table 4	1.05	1.05	1.05
RT vol. in pch	260	182	200
TH vol. in pch from Step 6	1858	278	278
Total PCV in pch	1858	440	440

Step 8.

Adjusted Volumes

Move-ment	Total PCV (Step 7)	U	W	Adjusted PCV (U+W)
2068	1.10	1	2275	
↑ 460	1.05	1	483	
↓ 443	1	1	443	

Step 9a. Calculate Lane Volumes

No. of Lanes	PCV per Lane
3	758
2	24
1	443

Step 9b. Volume Adjustment for Multiphase Signal Overlap

Probable Phase	Possible Critical Volume in pch	Volume Carryover to next phase	Adjusted Critical Volume in pch
----------------	---------------------------------	--------------------------------	---------------------------------

Step 10. Sum of Critical Volumes

$$758 + 241 + 443 = 1442 \text{ pch}$$

Step 11. Intersection Level of Service

$$V/C = \frac{1442}{1650} = 0.87 \quad \boxed{D}$$

Step 12. Recalculate

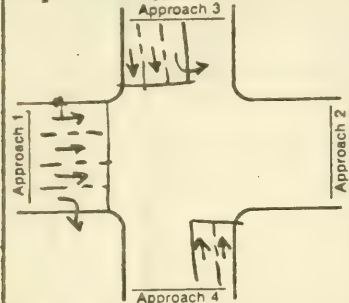
Geometric Change _____
Signal Change _____
Volume Change _____

Comments

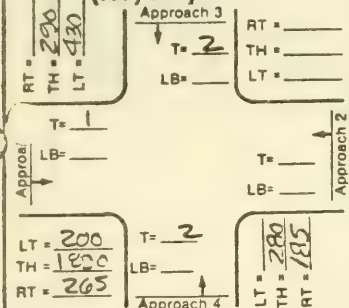
Critical Movement Analysis: OPERATIONS AND DESIGN Calculation Form 2

Intersection ENTRANCE RD @ CROSS RD Design Hour PM PEAK HR
 Problem Statement Determine 1987 level of service w/o development 1987 NO BLD

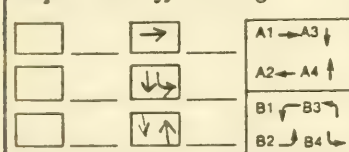
Step 1. Identify Lane Geometry



Step 2. Identify Hourly Volumes (HV) in vph



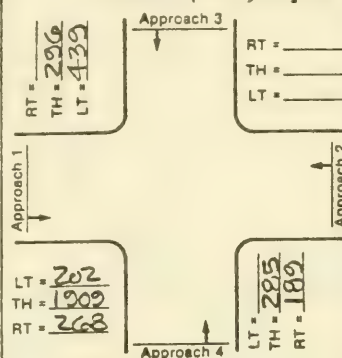
Step 3. Identify Phasing



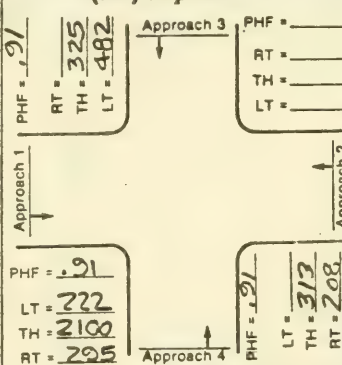
Step 4. Left Turn Check

	1	2	3	4
a. Number of change intervals per hour				
b. Left turn capacity on change interval, in vph				
c. G/C Ratio				
d. Opposing volume vph				
e. Left turn capacity on green, in vph				
f. Left turn capacity in vph (b + c)				
g. Left turn volume in vph				
h. Is volume > capacity (g > f)?				

Step 5. Develop Passenger Car Volumes (PCV) in pch



Step 6. Calculate Period Volumes (PV) in pch



Step 7. Turn Adjustments

Approach Movement	1	4	3
LT			
RT			
LT			
Turn volume (PV from Step 6)	222	208	492
Opposing vol. in vph from Step 2			
Ped. vol./hour			
PCE LT from Table 3	1.05		1.05
LT vol. in pch	233		506
PCE RT from Table 4		1	
RT vol. in pch		208	
TH vol. in pch from Step 6	2100	313	
Total PCV in pch	2333	521	506

Step 8.

Step 9a. Calculate Lane Volumes

Move-ment	Total PCV (Step 7)	U	W	Adjusted PCV (U+W+PCV)	No. of Lanes	PCV per Lane
→	2333	1.10	1	2566	3	855
↘	521	1.05		547	2	274
↙	506			506	1	506

Step 9b. Volume Adjustment for Multiphase Signal Overlap

Probable Phase	Possible Critical Volume in pch	Volume Carryover to next phase	Adjusted Critical Volume in pch
----------------	---------------------------------	--------------------------------	---------------------------------

Step 10. Sum of Critical Volumes

855 + 274 + 506 = 1635 pch

Step 11. Intersection Level of Service

1635 / 1650 = .99 [E]

Step 12. Recalculate

Geometric Change _____
 Signal Change _____
 Volume Change _____

Comments

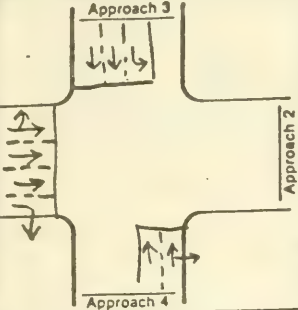
A=3-24

Critical Movement Analysis: OPERATIONS AND DESIGN

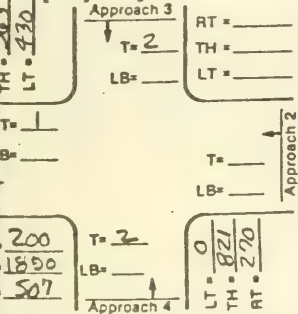
Section ENTRANCE & CROSS RD Design Hour PM PK HR 1997 BL

blem Statement Determines Future level of Service

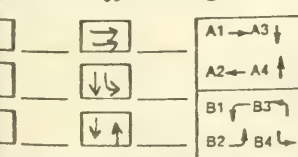
1. Identify Lane Geometry



2. Identify Hourly Volumes (HV) in vph



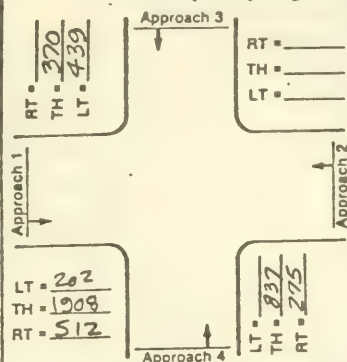
Step 3. Identify Phrasing



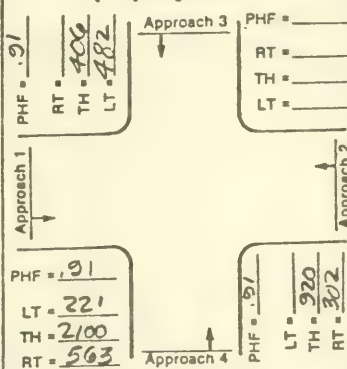
p 4. Left Turn Check

	1	2	3	4
number of				
large intervals				
hour				
ft turn capacity				
change interval,				
vph				
C				
to				
producing volume				
vph				
ft turn				
capacity				
rate, in vph				
ft turn				
capacity in vph				
e s)				
ft turn volume				
vph				
volume > capac-				
(s > ft)?				

Step 5. Develop Passenger Car Volumes (PCV) in pch



Step 6. Calculate Period Volumes (PV) in pch



Step 7. Turn Adjustments

Approach	1	4	3
Movement	LT	RT	RT
Turn			
Turn volume (PV from Step 6)	221	563	302
Opposing vol. in vph from Step 2			
Ped. vol/hour			
PCE LT from Table 3	1.05		1.0
LT vol. in pch	232		500
PCE RT from Table 4		1.00	1.00
RT vol. in pch		563	302
TH vol. in pch from Step 6	2100		916
Total PCV in pch	2332	563	1272

Step 8.

Step 9a.
Calculate
Lane

<i>Adjusted Volumes</i>	<i>Volumes</i>
1967-1980	1967-1980
1981-1990	1981-1990
1991-2000	1991-2000
2001-2010	2001-2010
2011-2020	2011-2020
2021-2030	2021-2030
2031-2040	2031-2040
2041-2050	2041-2050
2051-2060	2051-2060
2061-2070	2061-2070
2071-2080	2071-2080
2081-2090	2081-2090
2091-2100	2091-2100
2101-2110	2101-2110
2111-2120	2111-2120
2121-2130	2121-2130
2131-2140	2131-2140
2141-2150	2141-2150
2151-2160	2151-2160
2161-2170	2161-2170
2171-2180	2171-2180
2181-2190	2181-2190
2191-2200	2191-2200
2201-2210	2201-2210
2211-2220	2211-2220
2221-2230	2221-2230
2231-2240	2231-2240
2241-2250	2241-2250
2251-2260	2251-2260
2261-2270	2261-2270
2271-2280	2271-2280
2281-2290	2281-2290
2291-2300	2291-2300
2301-2310	2301-2310
2311-2320	2311-2320
2321-2330	2321-2330
2331-2340	2331-2340
2341-2350	2341-2350
2351-2360	2351-2360
2361-2370	2361-2370
2371-2380	2371-2380
2381-2390	2381-2390
2391-2400	2391-2400
2401-2410	2401-2410
2411-2420	2411-2420
2421-2430	2421-2430
2431-2440	2431-2440
2441-2450	2441-2450
2451-2460	2451-2460
2461-2470	2461-2470
2471-2480	2471-2480
2481-2490	2481-2490
2491-2500	2491-2500
2501-2510	2501-2510
2511-2520	2511-2520
2521-2530	2521-2530
2531-2540	2531-2540
2541-2550	2541-2550
2551-2560	2551-2560
2561-2570	2561-2570
2571-2580	2571-2580
2581-2590	2581-2590
2591-2600	2591-2600
2601-2610	2601-2610
2611-2620	2611-2620
2621-2630	2621-2630
2631-2640	2631-2640
2641-2650	2641-2650
2651-2660	2651-2660
2661-2670	2661-2670
2671-2680	2671-2680
2681-2690	2681-2690
2691-2700	2691-2700
2701-2710	2701-2710
2711-2720	2711-2720
2721-2730	2721-2730
2731-2740	2731-2740
2741-2750	2741-2750
2751-2760	2751-2760
2761-2770	2761-2770
2771-2780	2771-2780
2781-2790	2781-2790
2791-2800	2791-2800
2801-2810	2801-2810
2811-2820	2811-2820
2821-2830	2821-2830
2831-2840	2831-2840
2841-2850	2841-2850
2851-2860	2851-2860
2861-2870	2861-2870
2871-2880	2871-2880
2881-2890	2881-2890
2891-2900	2891-2900
2901-2910	2901-2910
2911-2920	2911-2920
2921-2930	2921-2930
2931-2940	2931-2940
2941-2950	2941-2950
2951-2960	2951-2960
2961-2970	2961-2970
2971-2980	2971-2980
2981-2990	2981-2990
2991-3000	2991-3000
3001-3010	3001-3010
3011-3020	3011-3020
3021-3030	3021-3030
3031-3040	3031-3040
3041-3050	3041-3050
3051-3060	3051-3060
3061-3070	

Move- ment	Total PCV (Step 7)	U	W	Adjusted PCV (U+W+PCV)	No. of Lanes	PCV per Lane
↗	2332	110	1	2545	3	855
↘	506	1	1	508	1	506
↑↓	1222	(105)	1	1283	2	641

Step 9b. Volume Adjustment for Multiphase Signal Overlap

Probable Phase	Possible Critical Volume in pch	Volume Carryover to next phase	Adjusted Critical Volume in pch
----------------	---------------------------------	--------------------------------	---------------------------------

Step 10. Sum of Critical Volumes

855 . 506 . 641 .
= 2002 pch

Step 11. Intersection Level of Service

$$2002 / 650 = 1.21 \quad \boxed{E}$$

Step 12. Recalculate

Geometric Change _____

Signal Change _____

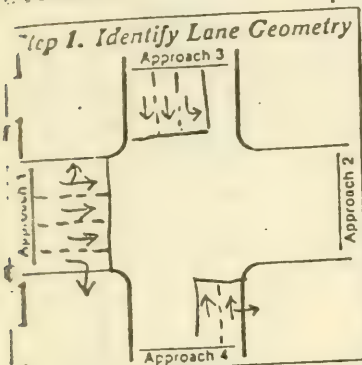
Comments

~~A-3-25~~

Critical Movement Analysis: OPERATIONS AND DESIGN

Calculation Form 2

Intersection ENTRANCE & CROSS RD Design Hour PM PK HR 1981/84
 Problem Statement Determine Future Level of Service WITH PORTER ST. CLOSURE



Step 2. Identify Hourly Volumes (HV) in vph

Approach 3: RT = 370, TH = 430, LT = 430
 T = 2, LB = 0

Approach 2: RT = 512, TH = 1208, LT = 202
 T = 2, LB = 0

Approach 4: RT = 507, TH = 1890, LT = 200
 T = 2, LB = 0

Step 3. Identify Phasing

Phase 1: A1 → A3, A2 → A4
 Phase 2: B1 → B3, B2 → B4

Step 4. Left Turn Check

Approach	1	2	3	4
Number of lanes	2	2	3	2
Left turn capacity	100	100	100	100
Left turn volume	202	202	430	0
Left turn capacity > volume?	Yes	Yes	Yes	Yes

Step 5. Develop Passenger Car Volumes (PCV) in pch

Approach 3: RT = 370, TH = 430, LT = 430
 Approach 2: RT = 512, TH = 1208, LT = 202
 Approach 4: RT = 507, TH = 1890, LT = 200

Step 6. Calculate Period Volumes (PV) in pch

Approach 3: PHF = .91, RT = 370, TH = 430, LT = 430
 Approach 2: PHF = .91, RT = 512, TH = 1208, LT = 202
 Approach 4: PHF = .91, RT = 507, TH = 1890, LT = 200

Step 7. Turn Adjustments

Approach	1	4	3	2
Turn	LT	RT	LT	RT
Turn volume (PV from Step 6)	221	503	302	432
Opposing vol. in vph from Step 2				
Ped. vol./hour				
PCE LT from Table 3	1.05			1.05
LT vol. in pch	232			506
PCE RT from Table 4		1.00	1.00	
RT vol. in pch		503	302	
TH vol. in pch from Step 6	2100		1308	
Total PCV in pch	2332	503	1690	506

Step 8. Adjusted Volumes

Movement (Step 7)	Total PCV	Adjusted PCV (U+V+PCV)	No. of Lanes	PCV per Lane
↕ 2332	1.10	2565	3	855
↘ 506	1	506	1	506
↑ 1690	1.05	1774	2	887

Step 9b. Volume Adjustment for Multiphase Signal Overlap

Probable Phase	Possible Critical Volume in pch	Volume Carryover to next phase	Adjusted Critical Volume in pch

Step 10. Sum of Critical Volumes

855 + 506 + 887 = 2248 pch

Step 11. Intersection Level of Service

$V/C = \frac{2248}{1690} = 1.33$ E

Step 12. Recalculate

Geometric Change _____
 Signal Change _____
 Volume Change _____

Comments

A-3-26

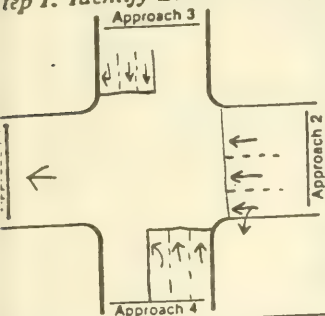
Critical Movement Analysis: OPERATIONS AND DESIGN

Calculation Form 2

Section Exit & Cross Rd - Logan Design Hour PM PKHR - 1979

Problem Statement Determine Existing Level of Service

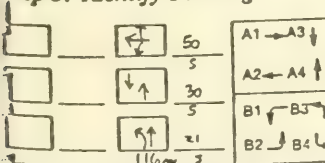
Step 1. Identify Lane Geometry



Step 2. Identify Hourly Volumes (HV) in vph

Approach 3	RT = 40
TH = 150	TH = 150
LT = 0	LT = 460
LB = 0	
Approach 2	RT = 52
TH = 0	TH = 0
LT = 0	LT = 0
LB = 0	
Approach 4	RT = 205
TH = 145	TH = 145
LT = 0	LT = 0
LB = 0	

Step 3. Identify Phasing



Step 4. Left Turn Check

Approach	1	2	3	4
Number of change intervals per hour				
Left turn capacity on change interval, in vph				
Left turn capacity in vph (b * e)				
Left turn volume in vph				
Left turn volume capacity				

Step 5. Develop Passenger Car Volumes (PCV) in pch

Approach 3	RT = 42
TH = 1575	TH = 1575
LT = 483	LT = 483
LB = 0	
Approach 2	RT = 229
TH = 152	TH = 152
LT = 0	LT = 0
LB = 0	
Approach 4	RT = 205
TH = 145	TH = 145
LT = 0	LT = 0
LB = 0	

Step 6. Calculate Period Volumes (PV) in pch

Approach 3	PHF = 0.91
RT = 46	RT = 46
TH = 1730	TH = 1730
LT = 530	LT = 530
LB = 0	
Approach 2	PHF = 0.91
RT = 329	RT = 329
TH = 162	TH = 162
LT = 0	LT = 0
LB = 0	
Approach 4	PHF = 0.91
RT = 205	RT = 205
TH = 145	TH = 145
LT = 0	LT = 0
LB = 0	

Step 7. Turn Adjustments

Approach Movement	4	3	2	1
LT	329	173	530	46
RT				
Turn volume (PV from Step 6)				
Opposing vol. in vph from Step 2	150	-	0	-
Pod. vol./hour	0	0	0	0
PCE LT from Table 3	1.05		1.05	
LT vol. in pch	345		555	
PCE RT from Table 4	-	1.00	-	1.00
RT vol. in pch	-	173	-	46
TH vol. in pch from Step 6	-	173	-	1730
Total PCV in pch	345	346	555	2176

Step 8.

Adjusted Volumes

Movement	Total PCV (Step 7)	U	W	Adjusted PCV (U+W+PCV)	No. of Lanes	PCV per Lane
←	1776	1.05	1.0	1864	2	932
↖	555	1		555	1	555
↗	233	1.10		2564	3	854
↓	346	1.05		363	2	181
↘	345	1	1	345	1	345

Step 9a. Calculate Lane Volumes

Step 9b. Volume Adjustment for Multiphase Signal Overlap

Probable Phase	Possible Critical Volume in pch	Volume Carryover to next phase	Adjusted Critical Volume in pch

Step 10. Sum of Critical Volumes

$$932 + 181 + 345 = 1458 \text{ pch}$$

Step 11. Intersection Level of Service

$$V/C = \text{Service} \quad (\text{compare Step 10 with Table 6})$$

$$1458 / 1650 = .88 \quad \boxed{D}$$

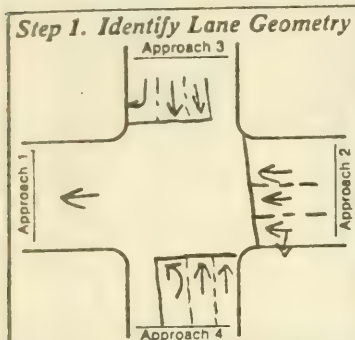
Step 12. Recalculate

Geometric Change	
Signal Change	
Volume Change	

Comments A-3-27

Critical Movement Analysis: OPERATIONS AND DESIGN Calculation Form 2

Intersection Exit Rd @ Cross Rd Design Hour PM PEAK HR
 Problem Statement Determine 1987 Level of Service w/o develop. 1987 NO BLO



Step 2. Identify Hourly Volumes (HV) in vph

Approach 3: RT = 140, TH = 170, LT = 10, T = 2, LB = 0

Approach 2: RT = 5, TH = 5, LT = 5, T = 5, LB = 0

Approach 4: RT = 320, TH = 465, LT = 0, T = 5, LB = 0

Approach 1: RT = 0, TH = 0, LT = 0, T = 0, LB = 0

Step 3. Identify Phasing

<input type="checkbox"/>	<input checked="" type="checkbox"/>	A1 → A3 ↓
<input type="checkbox"/>	<input checked="" type="checkbox"/>	A2 ← A4 ↑
<input type="checkbox"/>	<input checked="" type="checkbox"/>	B1 → B3 ↓
<input type="checkbox"/>	<input checked="" type="checkbox"/>	B2 ← B4 ↑

Step 4. Left Turn Check

Approach

	1	2	3	4
a. Number of change intervals per hour				
b. Left turn capacity on change interval, in vph				
c. G/C Ratio				
d. Left turn capacity on green, in vph				
e. Left turn capacity (b + d)				
f. Left turn volume (b + e)				
g. Is volume > capacity (g > f)?				

Step 5. Develop Passenger Car Volumes (PCV) in pch

Approach 3: RT = 173, TH = 23, LT = 0, RT = 47, TH = 177.5, LT = 84.6

Approach 2: RT = 0, TH = 0, LT = 0, RT = 336, TH = 173, LT = 0

Approach 4: RT = 0, TH = 0, LT = 0, RT = 0, TH = 0, LT = 0

Approach 1: RT = 0, TH = 0, LT = 0, RT = 0, TH = 0, LT = 0

Step 6. Calculate Period Volumes (PV) in pch

Approach 3: PHF = .91, RT = 190, TH = 190, LT = 0, PHF = .91, RT = 51, TH = 1950, LT = 600

Approach 2: RT = 0, TH = 0, LT = 0, RT = 369, TH = 190, LT = 0

Approach 4: RT = 0, TH = 0, LT = 0, RT = 0, TH = 0, LT = 0

Approach 1: RT = 0, TH = 0, LT = 0, RT = 0, TH = 0, LT = 0

Step 7. Turn Adjustments

Approach Movement	4	2	2
	LT	RT	LT RT
Turn	369	190	600 51
Turn volume (PV from Step 6)			
Opposing vol. in vph from Step 2			
Ped. vol./hour	105		405
PCE LT from Table 3			
LT vol. in pch	387		630
PCE RT from Table 4			
RT vol. in pch			51
TH vol. in pch from Step 6			1950
Total PCV in pch	387	190	630 2001

Step 8. Adjusted Volumes

Move-ment (Step 7)	Total PCV	Adjusted PCV			No. of Lanes	PCV per Lane
		U	W	(U+W*PCV)		
↖	387	1	1	387	1	387
↘	190	1	1	190	1	190
↗	2000	1.05	1	2100	2	1050

Step 9b. Volume Adjustment for Multiphase Signal Overlap

Probable Phase	Possible Critical Volume in pch	Volume Carryover to next phase	Adjusted Critical Volume in pch

Step 10. Sum of Critical Volumes

387 + 190 + 1050 = 1627 pch

Step 11. Intersection Level of Service

(compare Step 10 with Table 6)

1627/1650 = .99 **E**

Step 12. Recalculate

Geometric Change _____

Signal Change _____

Volume Change _____

Comments _____

A-3-28

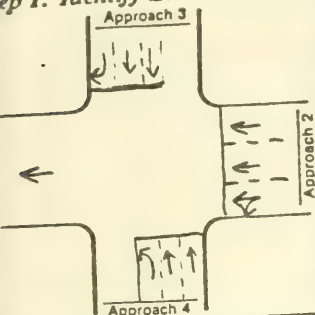
Critical Movement Analysis: OPERATIONS AND DESIGN

Calculation Form 2

Section EXIT & CROSS RD Design Hour AM PK HR - 1987 BULL

Problem Statement Determine Future Level of Service

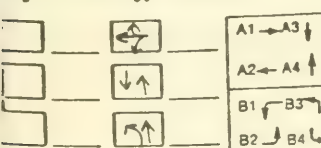
Step 1. Identify Lane Geometry



Step 2. Identify Hourly Volumes (HV) in vph

Approach	RT	TH	LT	LB
Approach 1	45	1690	520	
Approach 2				
Approach 3				
Approach 4				

Step 3. Identify Phasing



Step 4. Left Turn Check

Number of
change intervals
per hour
Left turn capacity
in change interval,
in vph
Left turn
volume
Left turn
capacity in vph
Left turn volume
in vph
Left turn capacity
(e.g.)

Approach	1	2	3	4
Left turn capacity				
Left turn volume				
Left turn capacity				
Left turn volume				
Left turn capacity				
Left turn volume				

Step 5. Develop Passenger Car Volumes (PCV) in pch

Approach	RT	TH	LT
Approach 1	178	261	0
Approach 2			
Approach 3			
Approach 4			

Step 6. Calculate Period Volumes (PV) in pch

Approach	RT	TH	LT
Approach 1	195	286	0
Approach 2			
Approach 3			
Approach 4			

Step 7. Turn Adjustments

Approach	4	3	2
Movement	LT	RT	LT
Turn	993	0	195
Opposing vol. in vph from Step 2	-	-	-
Ped. vol./hour	-	-	-
PCE LT from Table 3	1.05	-	1.05
LT vol. in pch	1042	-	641
PCE RT from Table 4	-	1.0	1.0
RT vol. in pch	-	195	52
TH vol. in pch from Step 6	-	-	286
Total PCV in pch	1042	195	286

Step 8.

Step 9a. Calculate Lane Volumes

Movement	Total PCV (Step 7)	Adjusted PCV (U=1)	No. of Lanes	PCV per Lane
←	2001	1.05	2	1050
↖	611	1	1	611
↓	286	1.05	2	150
↘	195	1	1	195
→	1042	1	1	1042
↗	2612	1.10	3	960

Step 9b. Volume Adjustment for Multiphase Signal Overlap

Probable Phase	Possible Critical Volume in pch	Volume Carryover to next phase	Adjusted Critical Volume in pch

Step 10. Sum of Critical Volumes

$$1042 + 195 + 960 = 2297 \text{ pch}$$

Step 11. Intersection Level of Service

$$\frac{2297}{1050} = 1.39 \quad \text{E}$$

Step 12. Recalculate

Geometric Change	
Signal Change	
Volume Change	
Comments	

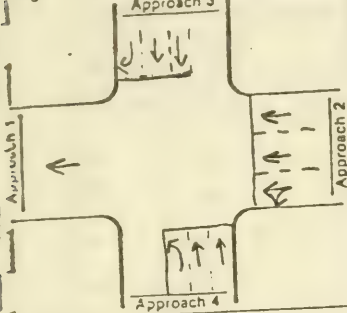
A-3-29

Critical Movement Analysis: OPERATIONS AND DESIGN
Calculation Form 2

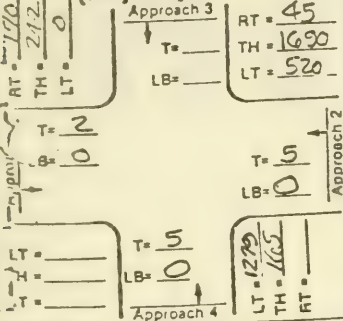
Intersection EXIT & CROSS RD Design Hour PM PKHR - 1987 BUL
Exit level of Service WITH PORTER ST. CLOSED

Statement Determine Future Cost of Service

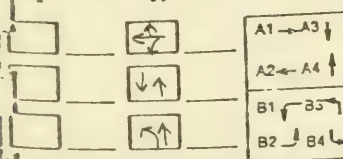
Step 1. Identify Lane Geometry



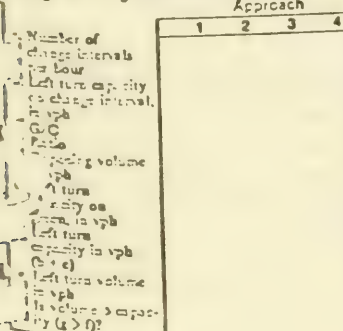
Step 2. Identify Hourly Volumes
(HV) in vph



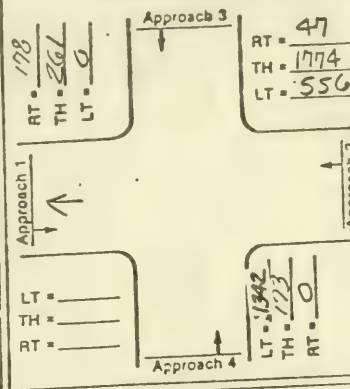
Step 3. Identify Phrasing



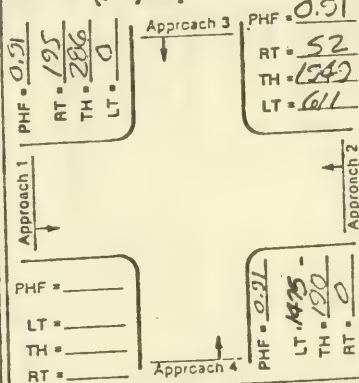
Step 4. Left Turn Check



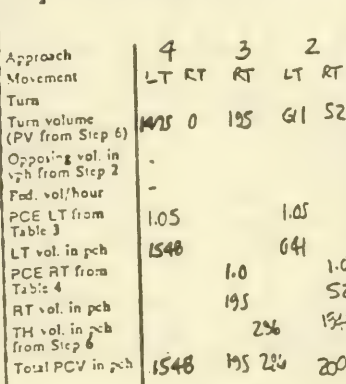
Step 5. Develop Passenger Car Volumes (PCV) in pch



Step 6. Calculate Period Volumes (PV) in pch



Step 7. Turn Adjustments



Step 8.

Step 9a.
Calculate
Lane

	Adjusted Volumes		Volumes	
Movement	Total PCV (Step 7)	Adjusted PCV (U=W+PCV)	No. of Lanes	PCV per Lane
←	2001	1.05	1	2100
↙	611	1	1	611
↓	286	1.05	1	300
↘	195	1	1	195
↙	11548	1	1	1548
↘	2612	1.10	1	2873
			3	960

Step 9b. Volume Adjustment for Multiphase Signal Overlap

Probable Phase	Possible Critical Volume in pch	Volume Carryover to next phase	Adjusted Critical Volume in pch

Step 10. Sum of Critical Volumes

1540 . 195 . 960 . ¹⁰⁵⁸
= 2793 pch

Step 11. Intersection Level of Service

$\frac{2793}{1650} = 1.69$ E

Step 12. Recalculate

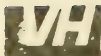
Geometric Change _____
Signal Change _____
Volume Change _____

Comments

A-3-30

LEVEL OF SERVICE CALCULATIONS

TUNNEL - LINK



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17 / 482-1870

JOB: MASSPORT / BIF JOB No. _____
LOCATION: _____ SHEET 1 OF 1
CALCULATED BY: WJR DATE: 12 FEB 81
CHECKED BY: _____ DATE: _____
TITLE: _____

TUNNEL CAPACITY

• LINK

	12
	12

GEOMETRY

- 2 - 12' LANES
- 2' LAT. OBSTRUCTIONS BOTH SIDES
- 3 % TRUCKS
- TERRAIN ROLLING
ASSUME 1/2 MILE OF 5% GRADE

$$C = 2000 \text{ N.W.T. } \frac{11}{1}$$
$$= 2000 \times 2 \times .94 \times .92$$

$$C = 3460 \text{ VPH}$$

• CENTRAL ARTERY / RAMP MERGE

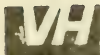
ABSOLUTE CAPACITY 2000 VPH @ LOS "E"

- PED. SIGNAL CAPACITY 2000 VPH @ LOS "E"
(SEE ATTACHED CALCULATIONS)

11 HIGHWAY CAPACITY MANUAL - CH. 9

LEVEL OF SERVICE CALCULATIONS

CENTRAL ARTERY/RAMP MERGE



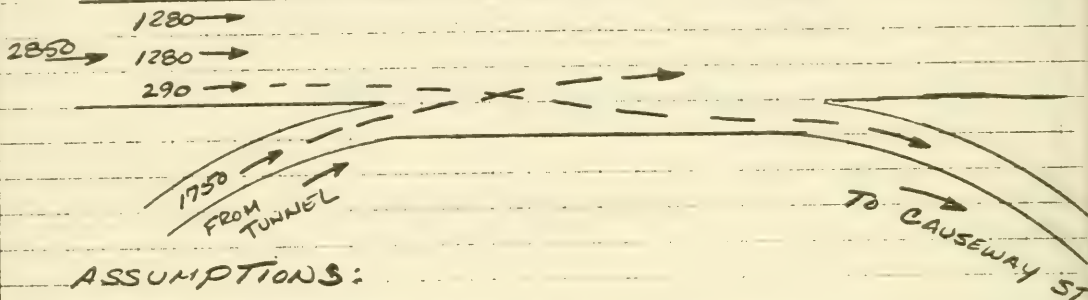
Vanasse / Hangen Engineering, Inc.
Consulting Engineers & Planners
84 High Street, Boston, Massachusetts 02110
617 / 482-1870

JOB: _____ JOB No. _____
LOCATION: _____ SHEET 1 OF 2
CALCULATED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____
TITLE: LEVEL OF SERVICE ANALYSIS

CENTRAL ARTERY / RAMP MERGE

1979 CONDITIONS PM PEAK HOUR

CENTRAL ARTERY N.B.

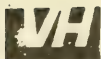


ASSUMPTIONS:

- ① THE RIGHT HAND LANE OF THE N.B. ARTERY UPSTREAM OF THE TUNNEL ON RAMP IS OCCUPIED BY CAUSEWAY ST RAMP TRAFFIC ONLY
- ② BECAUSE OF THE SHORT RAMP SPACING, THE MERGE MANEUVER IS CRITICAL

$$\text{TOTAL MERGE VOLUME} = 1750 + 290 = 2040$$

$2040 > 2000 \therefore$ MERGE IS AT CAPACITY



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JOB _____ JOB No. _____
LOCATION _____ SHEET 2 OF 2
CALCULATED BY _____ DATE _____
CHECKED BY _____ DATE _____
TITLE _____

• PED. SIGNAL

CAPACITY = 2000 VPH
EXISTING VOLUME = 1570

RESIDUAL CAPACITY = 430 VPH

CONCLUSIONS

- 1) THERE IS RESIDUAL CAPACITY BOTH IN THE TUNNEL AND AT THE CENTRAL ARTERY TERMINAL
- 2) THE RESIDUAL CAPACITY AT THE CENTRAL ARTERY TERMINAL IS ONLY FOR SOUTHBOUND MOVEMENT. (IE THROUGH THE PED SIGNAL). BASED ON THE ANALYSIS APPROXIMATELY 400 VPH COULD BE ADDED TO THE TUNNEL PROVIDED THIS TRAFFIC WAS DESTINED FOR THE ARTERY SOUTHBOUND OR BOSTON LOCAL.
- 3) NO ADDITIONAL TRAFFIC CAN BE ADDED TO THE ARTERY ON RAMP.
- 4) THIS RESIDUAL CAPACITY WILL VARY WITH CONDITIONS ON THE ARTERY BOTH NORTH BOUND AND SOUTHBOUND

LEVEL OF SERVICE CALCULATIONS

PEDESTRIAN SIGNAL NEAR
HANOVER STREET



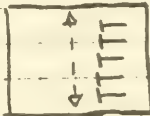
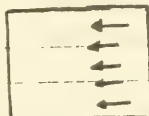
JOB: BIRD ISLAND FLATS JOB No. _____
 LOCATION: _____ SHEET 1 OF 3
 CALCULATED BY: JJK DATE: FEB 12, 1988
 CHECKED BY: _____ DATE: _____
 TITLE: CAPACITY ANALYSIS

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 Consulting Engineers & Planners
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CAPACITY OF A PEDESTRIAN CROSSING SIGNAL ON CROSS ST. BETWEEN SALEM & HANOVER STS.

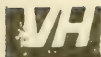
CONDITIONS:

- EXISTING TIMING FROM CITY OF BOSTON
 DEPT. OF TRAFFIC & PARKING



66 4 2 10 8 90 SECS
 G Y R W FDW TOTAL

- LANE STRIPPING INDICATES THE POTENTIAL OF
 5 LANES ON CROSS STREET - DOWN STREAM
 CONDITIONS REDUCE USE TO 3 LANES (I)
 SINCE MOST TRAFFIC FAVORS TWO LANES
 AGAINST THE ARTERY ASSUME 2 1/2 LANES USED
- DETERMINE PER LANE CAPACITY BASED ON
 AVAILABLE TIME WITH THE FOLLOWING ASSUMPTIONS:
 (CONSERVATIVE ESTIMATE)
 - A. 2.5 SEC START-UP DELAY
 - B. 2.1 SEC HEADWAY
 - C. NO USE OF AMBER OR ALL-RED CLEARANCE
- DETERMINE PER LANE CAPACITY BASED ON
 FOLLOWING ASSUMPTIONS
 - A. 1 SEC. START-UP DELAY
 - B. 2.1 SEC HEADWAY
 - C. USE OF AMBER TIME CALC BY $1.32 + 0.5V$
 WHERE $V = 30 \text{ MPH}$ = 2.82
- USE CHART 7 OF HIGHWAY CAPACITY CHARTS
 ASSUMING 28' LANE WIDTH



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JOB: _____ JOB No. _____
LOCATION: _____ SHEET 2 OF 3
CALCULATED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____
TITLE: _____

METHOD ONE (CONSERVATIVE)

$$\text{CAPACITY} = (66 - 2.5) / 2.1 = 30.2 \text{ SAY } 30 \text{ VPL}$$

BASED ON USE OF 2.5 LANES

$$\text{CAPACITY} = 75 \text{ VEHICLES PER CYCLE}$$

WITH 40 - 90 SEC. CYCLES PER HOUR

$$\text{CAPACITY} = 3000 \text{ VEHICLES PER HOUR}$$

NOTE: LOADING ALL VEHICLES INTO 2 LANES
GIVES CAPACITY OF 2400 VPH

METHOD TWO

$$\text{CAPACITY} = (66 + 2.82 - 1) / 2.1 = 32.3 \text{ SAY } 32 \text{ VPL}$$

ON 2.5 LANES CAPACITY = 80 VPC

OR 3200 VPH

IN TWO LANES CAPACITY = 2560



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JOB: _____ JOB No. _____
LOCATION: _____ SHEET 3 OF 3
CALCULATED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____
TITLE: _____

METHOD 3

HIGHWAY CAPACITY CHARTS - #7 ONE WAY CBD

(NO PARKING)

WIDTH OF APPROACH 28' (NOTE ACTUAL WIDTH 50' (3))

5% TRUCKS

0% RIGHTS

0% LEFTS

PEAK HOUR FACTOR .85] CONSERVATIVE

METRIC PEAK FACTOR 1.15

G/C RATIO = 66/90 = .73

CAPACITY = 2100 VPH

BASED ON 30' WIDTH AND 1.20 MPF (= .90 PEAK HOUR)

CAPACITY = 2300 VPH

ASSUME CAPACITY OF 2000 VPH
due to interference of parking, MANEUVERS,
pedestrian activity, MONITOR ST traffic influence,
etc.

MASSACHUSETTS PORT AUTHORITY

TO: Norman Faramelli
FROM: Gordon Lewin
DATE: February 12, 1981
RE: Bird Island Flats

Calculation of peak period traffic impact of B.I.F. at various sizes of commercial development:

A. Office Development

Chart A is a calculation of Peak Generation of Office Development at B.I.F. for 100,000 through 500,000 sq. ft. of office space.

The data is derived as follows (using worst case assumptions where applicable.)

***278 square feet of office space per person (source: "Experience Exchange Report Survey", Greater Boston Real Estate Board, Building Owners and Managers Association, 1978. Survey of office buildings in Boston.)

***3.6 persons per 1,000 square feet of office space

***3.3 peak cars per 1,000 square feet at 1.1 occupancy level

80.4% Auto Drivers
6.7% Passengers
87.1% Arrivals in Cars
6.6% Transit and MassPort Bus
4.4% Walk and Other

***70% of all auto trips assumed to travel through tunnel

***All numbers are one-way trips

***Mode split, occupancy level, and tunnel/northbound split from
Logan Airport Employee Survey 1980

CHART A
PEAK GENERATION OF OFFICE DEVELOPMENT

Level of Development (1,000 sq. ft.)	Total Cars	Transit	Walk & Other	Tunnel Cars
500	1437	119	79	442
400	1150	95	63	345
300	862	71	47	259
200	547	48	32	164
100	287	24	16	86

B. Manufacturing

Chart B is a calculation of Manufacturing employment generated traffic at B.I.F. Since Manufacturing shifts break at 7 a.m., 3 p.m. and 11 p.m., there is no peak period impact of manufacturing at B.I.F.

The data is derived as follows:

***2-3 persons per 1,000 square feet (Source: "Trends in the Real Estate Market", John E. Cunningham, Exec. V.P., Wang Labs, speech at Pier 4, 1/27/81: "One Million Sq. Ft. of Manufacturing Generates Two to Three Thousand Jobs.")

***333-500 sq. ft. per person

***1.8-2.7 cars per 1,000 sq. ft. at 1.1 occupancy (We are using 2.7 car estimate)

***Mode split: same as Chart A

CHART B

Level of Development (1000 Sq. Ft.)	Total	Transit	Walk & Other	Tunnel (Off Peak)
300	697	60	40	209
200	470	40	26	141
100	235	20	13	70

C. Hotel

Hotel development has no impact on peak hour movements through the tunnels. Travel to and from downtown from the hotel development is not anticipated to generate any significant contribution to the peak from visitors. Employment at hotels are multi-shift operations which will disperse travel impact throughout a 24-hour day. (Survey Results: MBTA Employee Work Hour Survey.)

MITIGATION MEASURES

A. Carpooling

Massport is developing a carpool promotion program for employees which will include discounted parking rates for carpools and preferential parking spaces for carpools. We estimate that implementation of these programs will increase carpool at B.I.F. to occupancy rates 10% above the current level for Logan employees of 1.1 persons per automobile.

Carpool occupancy rate used to estimate the impact of the mitigating program is 1.2 persons per car. Given the low level of carpooling currently, a 10% increase in occupancy rate translates to a 100% increase in actual carpools.

B. Increased Transit Usage

Transit usage can be increased by adding an additional shuttle bus loop to serve the new development at B.I.F. In addition, promotion, sale, and subsidization of transit passes by employers as currently conducted by Massport, can aid in increasing transit usage. We estimate that implementing the shuttle bus by Massport and a pass program by participating employers can increase transit usage by 10%.

C. Ferry Service

In January, 1981, Massport completed an initial Feasibility Study of Cross Harbor Ferry Service. The study concluded that a market existed for such a service, particularly if development occurred at Bird Island Flats. Utilizing the most conservative estimates of ridership from the study, we believe that a ferry could generate ridership of at least 1.8% of Bird Island Flats employment.

D. Flexible and Staggered Work Hours

Flexible and Staggered Work Hour programs by employers can be used to spread the traffic impact of the Bird Island Flats project over a greater period of time, thereby mitigating additional congestion reaching the tunnel at a particular point in time.

Flexible and staggered work hour programs have been widely adopted by businesses and government agencies throughout the Greater Boston area. Flexible work hours, which gives employees the choice of arrival times within certain constraints has been most popular in office environments. In a survey conducted by a major insurance company in Boston, over two out of every three employees choose to arrive between 7:30 and 8:00 a.m. (69%). (Source: MBTA Variable Work Hours Report.)

While some manufacturing firms (particularly in electronics) offer flexitime, most operate on fixed shifts which change outside of the peak period. The typical multi-shift operation has daytime employees start work at 7 a.m. and leave work at 3:00 p.m.

Our estimates of flexible work hours is based on 69% of employees arriving between 7:30 a.m. and 8:00 a.m. and leaving between 3:30 and 4:00 p.m. The remaining 31% are estimated to arrive between 8:00 and 9:00 a.m. (When companies offer arrival times between 9-10 a.m., very few employees choose these hours.) It is important to note that these work hour programs can be expected to spread demand over a two-hour period, each at the beginning and end of the work day, rather than a six-hour period or more.

CHART C

PEAK GENERATION OF OFFICE DEVELOPMENT
WITH MITIGATION EFFORTS

1. 10% Increase in Car Occupancy
2. 10% Increase in Transit Usage (Transit Passes & Bus Loop)
3. 1.8% Ferry Usage
4. 69% of Employees Arrive Between 7:30 and 8:00, Leave Between 3:30 and 4:00 p.m.

**278 sq. ft. per person

**3.6 people per 1,000 sq. ft.

**3 peak cars per 1,000 sq. ft. at 1.2 occupancy

**70% of cars travel through tunnel

72% Drivers

14.4% Passengers

86.4 Car Riders
7.3% MBTA Plus Shuttle Bus
4.4% Walk and Other
1.8% Ferry Use

Level of Development (1,000 Sq. Ft.)	Total Car	Transit	Walk	Ferry	Total Tunnel	Peak Tunnel
500	1296	131	79	33	389	121
400	1037	109	63	26	311	96
300	778	79	47	20	236	73
200	518	52	32	13	155	48
100	259	26	16	7	78	24

CHART D

EMPLOYMENT GENERATED TRAFFIC (WORK TRIP)
TO MANUFACTURING DEVELOPMENT

(Mode split and mitigation effects same as in Chart C except--cars per 1,000 sq. ft. = 2.5 due to different employment density of manufacturing and that there is no peak tunnel impact due to work shifts.)

Level of Development (1,000 Sq. Ft.)	Total Cars	Transit	Walk	Ferry	Total Tunnel
300	648	66	40	16	194
200	432	44	26	11	130
100K	216	22	13	5	65

CHART E

COMBINED OFFICE AND MANUFACTURING
NO MITIGATION

Level of Development (1,000 Sq. Ft.)	Total Cars	Transit	Walk	Tunnel 3:00-3:15 p.m.	Tunnel 5:00-5:15 p.m.
500 Office	2134	179	119	209	442
300 Manufacturing					
400 Office	1620	135	89	141	345
200 Manufacturing					
200 Office	782	68	45	70	164
100 Manufacturing					

CHART F

COMBINED OFFICE AND MANUFACTURING
WITH MITIGATION

Level of Development (1,000 Sq. Ft.)	Total Cars	Transit	Walk	Ferry	Tunnel 3-4 p.m.	Tunnel 4-5:15
500 Office	1944	197	119	49	462	121
300 Manufacturing						
400 Office	1469	149	39	37	345	96
200 Manufacturing						
200 Office	734	74	20	18	177	48
100 Manufacturing						

MASSACHUSETTS PORT AUTHORITY

TO: Norman Faramelli

FROM: Gordon Lewin

DATE: February 12, 1981

RE: Re-Calculation with Hangen Data

Per your request, I have re-calculated auto generation and mitigation charts of my "Bird Island Flats" memo. All assumptions are the same except the following which were changed to conform with those of Rich Hangen for the congestion analysis:

1. Peak hour auto generation is calculated at 1.36
2. 46% of auto trips assumed to travel through tunnel

CHART A

OFFICE GENERATION

Level of Development (1,000 Sq. Ft.)	Total Cars	Tunnel Cars	Generation Factors
500	680	313	11 ADT/1,000 Sq. Ft.
400	544	250	(or 5.5 entering
300	408	188	vehicles/1000 sq. ft.)
200	272	125	
100	136	63	

CHART B

MANUFACTURING GENERATION

Level of Development (1,000 Sq. Ft.)	Cars	Tunnel	
300	195	90	4 ADT/1000 sq. ft.
200	130	60	(Two entering
100	65	30	vehicles/1000 sq. ft.)

CHART C

OFFICE DEVELOPMENT WITH MITIGATION

Level of Development (1,000 Sq. Ft.)	Cars	Total Tunnel	Peak Tunnel
500	617	284	88
400	494	227	70
300	370	170	53
200	246	114	35
100	123	57	18

CHART D
MANUFACTURING WITH MITIGATION

Level of Development (1,000 Sq. Ft.)	Cars	Tunnel
300	181	83
200	121	56
100	60	28

CHART E
COMBINED OFFICE & MANUFACTURING
NO MITIGATION

Level of Development (1,000 Sq. Ft.)	Total Cars	Tunnel 3:00-4:00	Tunnel 4:15-5:15
500 Office/300 Manf.	875	90	313
400 " 200 "	674	60	250
200 " 100 "	337	30	125

CHART F
COMBINED OFFICE & MANUFACTURING
WITH MITIGATION

Level of Development (1,000 Sq. Ft.)	Total Cars	Tunnel 3-4	Tunnel 4:15-5:15
500 Office/300 Manf.	798	279	88
400 " 200 "	615	213	70
200 " 100 "	306	107	35

APPENDIX A-4 - Letters related to the
Final EIR

January 22, 1981

Mr. John Bewick
Secretary of Environmental
Affairs
100 Cambridge St.
Boston, Ma.

Dear John:

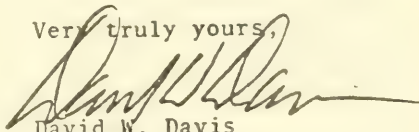
Following up on our conversation of yesterday, I was most distressed to learn that your staff has now cancelled the meeting scheduled this afternoon to review the status of the Bird Island Flats project.

I believe your canceling the meeting today to discuss the technical issues around this project and requiring a supplemental EIS effectively will kill the development for this construction season and drive air cargo carriers currently committed to Bird Island Flats to other regions of the country.

The economic stakes in this development are quite high, not only for the metropolitan area but for the entire New England region.

This project means more than 3000 construction and permanent jobs. John, I would ask you to set aside one half hour today to talk with me about this project. I believe that we certainly should be able to resolve any outstanding issues your staff may have at that time.

Very truly yours,



David W. Davis
Executive Director

DWD/ell



massport

88 HIGH ST. BOSTON, MASSACHUSETTS 02110 (617) 482 2930 TELEX 94 0365

January 23, 1981

Mr. John Bewick
Secretary of Environmental Affairs
Executive Office of Environmental Affairs
100 Cambridge St.
Boston, Massachusetts

Dear John,

In view of the complexity of the Bird Island Flats EIR Process and the public interest in the issues it raises, we are prepared to accept an extension of the comment period to February 13 with a determination of the Secretary by February 20.

We recognize that this process has given rise to an unusually broad and complex range of comments. We will use this extension to provide further clarifying comments and views of others who have been involved in the process which we have been monitoring closely in recent weeks. Nonetheless, it is our view that the FEIR analysis is adequate as it now stands.

With all federal approval now in hand and a commitment from you to complete the state review in four weeks, this important regional project can move forward for this construction season.

Sincerely yours,

MASSACHUSETTS PORT AUTHORITY

David W. Davis
Executive Director

A-4-2



The Commonwealth of Massachusetts

Executive Office of Environmental Affairs

100 Cambridge Street

Boston, Massachusetts 02202

EDWARD J. KING
GOVERNOR

JOHN A BEWICK
SECRETARY

January 23, 1981

Mr. David W. Davis, Executive Director
Massachusetts Port Authority
99 High Street
Boston, MA 02108

Mr. Donald J. Loritz, Secretary
East Boston Land Use Advisory Council
294 Marginal Street
East Boston, MA 02128

Gentlemen:

RE: EOEa No. 03587, Bird Island Flats

Both Massport and EBLUAC have requested that I extend the time for review of the Final EIR on the Proposed Development of Bird Island Flats. I grant this request, with the following conditions:

1. Massport shall mail copies of the addenda to the FEIR to all persons who have been furnished copies of the Final EIR. The addenda should be mailed on January 26, 1981.
2. Additional comments or responses to comments may be submitted until the close of business on February 13, 1981. I shall take into consideration all such comments and responses, and shall issue my decision on the adequacy of the Final EIR on or before February 20, 1981.
3. All comments received will be available for review at the MEPA Office.

Sincerely yours,

John A. Bewick
Secretary

JAB/kg

cc: All commenters on Final EIR

A-4-3

Boston

February 6, 1981

Mr. John Bewick
Secretary
Department of Environmental Affairs
The State House
Boston, Massachusetts

Dear Secretary Bewick:

I am pleased to note that you have extended the comment period concerning the Bird Island Flats project of the Massachusetts Port Authority. The City intends to fully utilize this period to attempt to resolve our differences with the Massachusetts Port Authority concerning this project. For your information, these concerns include:

- 1) The City strongly supports the so-called mixed use development along the western portion of the Bird Island Flats, and we are convinced by the documentation included in the Environmental Impact Report and by our own review that this mixed-use development will substantially diminish the noise exposure from existing and proposed airplane activity. As you know, airport noise has always been our principal environmental concern in this area, and aviation activity on this part of the airport, and the expanded aviation activity proposed on the Bird Island Flats cause noise exposure problems particularly in the Jeffries Point section and in the Porzio Memorial Park, which as you know is protected under Section 4F of the U.S. Department of Transportation Act as well as presenting an esthetic concern for the City. The mixed-use activity along the western portion of the Bird Island Flats project provides for substantial reduction of noise exposure in the noise sensitive areas, and in addition will enhance the environment of the Porzio Park, the East Boston Community, and the entire City by the provision of a landscaped park wateredge, and pleasant looking buildings, which will serve as an additional measure to mitigate damage to the Porzio Park caused by existing and proposed aviation activity in the Bird Island Flats area. We are extremely concerned that the City receive adequate assurances that this beneficial part of the project will proceed prior to any increase in aviation activity in the project area.

Kevin H. White, Mayor / OFFICE OF THE MAYOR / Boston City Hall / City Hall Plaza 02201

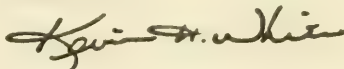


- 2) The City remains concerned with the amount of aircargo activity proposed in the project, and the orientation of the buildings which would house these proposed activities. We feel strongly that reduced levels of activity and different orientation of some buildings would reduce airport noise exposure in affected areas, and truck traffic in the vicinity, and feel that these alternatives were not adequately considered in the Environmental Impact Report. We are hopeful that there will be adequate treatment of this very important subject during the extended comment period.
- 3) The City is concerned with the implication of encouraging freight forwarding activity as proposed in the plan for Bird Island Flats. The East Boston residents have proposed that such intense truck generating activity should be located away from the airport, to minimize the number of truck movements to and from the airport to the absolute minimum of fully loaded two-way truck movements. The City strongly supports this view and shares this concern, and we look to some increased attention to this matter in the extended comment period.
- 4) The City is concerned with the impact of general aviation activity upon the community adjacent to the airport and the entire City. As you know, general aviation ground activity has been a major source of noise to the Jeffries Point section of East Boston. The project proposes the relocation of general aviation to Bird Island Flats, which should reduce this adverse impact but we look during this comment period for consideration of relocating general aviation elsewhere. In addition, we note with concern that some comment to you has encouraged the consideration of constructing an additional runway to accommodate general aviation. The Environmental Impact Report has properly recorded the history of that runway, including the fact that litigation initiated by the City of Boston culminated in a court agreement between the City of Boston and the Massachusetts Port Authority that the runway would not be built, and that that agreement was specifically voted by the Massachusetts Port Authority as an additional step to mitigate damage in the Environmental Impact Report for the completion of Runways 9 and 4L with extended safety areas. I wish to restate for the record that the City of Boston continues to view any construction of Runway 14-32 as fundamentally inconsistent with our plans and interests, and severely damaging to the environment and safety of Boston residents, and would vigorously oppose any effort to reopen that question.
- 5) Residents of East Boston have proposed larger amounts of mixed-use to the exclusion of some or all aircargo and general aviation type activity. I believe it is appropriate to use the extended comment period to consider this alternative.
- 6) I wish to note here that my concern over the status of the existing in-lieu-of-tax payment formula between Massport and Boston, as stated in my letter of January 13, 1981 to Dave Davis, has been resolved to my satisfaction and is no longer applicable.

In closing, in order to protect the City's ability to defend its rights, I am hereby filing my intent to sue under the Massachusetts Environmental Protection Act, should our concerns not be adequately addressed during this extended comment period. In reliance upon your extension of the comment period, I also reserve the right of the City to raise any further concerns which may arise during this comment period, which I understand leaves the record open until February 13, 1981.

Finally, I wish to convey my appreciation to you for providing this additional period to resolve these important issues.

Sincerely,

A handwritten signature in dark ink, appearing to read "Kevin H. White". The signature is fluid and cursive, with the first name "Kevin" being more prominent.

Kevin H. White
Mayor

KHW/jc

The Commonwealth of Massachusetts

Executive Office of Transportation & Construction

One Ashburton Place

Boston, Massachusetts 02108



BARRY M. LOCKE
SECRETARY

February 6, 1981

Mr. Robert Weinberg, Chairman
Massport Board of Directors
99 High Street
Boston, MA 02110

Dear Mr. Weinberg:

As Secretary of Transportation and Construction of the Commonwealth, I am writing in regard to the Final Environmental Impact Statement/Report recently filed by the Massachusetts Port Authority concerning the proposed development of Bird Island Flats.

I have carefully reviewed and analyzed the provisions contained within the FEIS/R document and their potential impacts on the Logan facility, airport tenants and business community users. This examination indicates an undertaking of major proportion and outlines an ambitious development scheme which will require a tremendous commitment of your organization's financial, administrative and human resources. In concept, the prior development of Bird Island Flats for air cargo processing and related activities is a critical component in our strategic planning for a future of economic growth and stability for both the Massachusetts and New England communities.

However, certain aspects of this proposal are of major concern to me. These concerns focus on the following five principal areas:

Future Development of a GA/Commuter Reliever Runway 14/32

I strongly recommend that any provisions of BIF development should not preclude the near-future development and utilization of an all-weather bi-directional (14/32)

fully-instrumented GA/Commuter Reliever (3850-4000 ft.) runway facility located on said site. The proposed short extension of Runway 15L-33R clearly is not a safe or realistic solution to airport capacity problems for general aviation. Unquestionably, the wake turbulence vortex factor involved with heavy/wide-bodied aircraft utilizing the existing 15L-33R runway precludes the Massport scenario. The magnitude of wake vortices on 15L-33R would create a major safety hazard to smaller GA-type aircraft. Hence, the aforementioned extension should not be considered and should be removed from the document.

Mixed-Use Complex

The proposed hotel/conference center and office space development of BIF should not be carried out on this site. This format is not practical nor useful for the BIF site. The original purpose for BIF construction was and continues to be for the development of air cargo, relocation of all general aviation activities and STOL runway capabilities. Therefore, we strongly recommend the removal of the mixed-use component from the BIF plan.

General Aviation

Aside from the much needed air cargo facility development on BIF, an excellent opportunity exists for the centralization of all general aviation facilities on BIF. The transfer of GA support service facilities (i.e. Van Dusen, Butler Aviation, etc.) coupled with a 14/32 (3850-4000 ft.) runway would provide for maximum optimization of scarce airport land and satisfy many needs of the GA/Corporate aviation community. We believe that this plan should be instituted on BIF.

Service Roadway System (Taxiway Preservation)

The proposed service roadway alignment to BIF is deficient in many aspects. We believe the existing roadway to BIF, with certain modifications, is sufficient to meet the projected demands of BIF development. Also, utilization of the existing road would negate any adverse impact on the nearby community. Furthermore, construction of the proposed new service roadway would destroy and eliminate the present dual taxiway system, causing significant aircraft traffic congestion which will create high-level air pollution and operational delays relative to all flight operations originating from or destined to the the Eastern Hangar and Southwest Terminal, subsequently leading to a severe safety hazard.

Routing increased vehicular traffic through a new road alignment will increase its adverse environmental effects on the abutting residential community. Additionally, the proposed roadway alignment and its impact on Logan's existing overall

roadway system in and around the airport terminal (and related) facilities will create an intolerable traffic flow and capacity problem. The current roadways already experience a tremendous burden, the proposed alignment would adversely intensify this situation.

Therefore, we recommend utilization of the existing service roadway to BIF, with some modification, with its existing connection with the airport traffic system. Secondly, Massport must take all measures to:

1. preserve the airport's most vital dual-taxiway system especially in the northwest corner of the BIF site;
2. upgrade and improve Logan's primary and service roadway system to ensure efficient and effective vehicular traffic management methods.

Certain Land for MDC Use

It is essential for Massport to reserve approximately a 1.5 acre parcel of land preferably located in the Southwest corner area of BIF, for the construction of a sewage separation facility to be added in to the existing Porter Street Outfall sewer line. This land reservation serves an essential public purpose.

In summary, I strongly urge that the above described areas of concern be addressed immediately by you and your organization. I stand ready to cooperatively work along with Massport in rectifying these concerns and assisting you in moving this project through the final review process.

I believe strongly that the recommendations and comments contained herewith, will make the BIF development program a viable efficient and comprehensive endeavor, therefore, positively contributing to our economic competitiveness as both a state and region.

I look forward to discussing this most important project with you in the near future.

Sincerely yours,


Barry M. Locke
Secretary

BML:caz



88 HIGH ST. BOSTON, MASSACHUSETTS 02110 (617) 482-2930 TELEX 94 0365

February 12, 1981

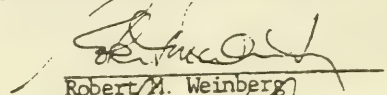
Secretary John Bewick
Executive Office of Environmental
Affairs
One Ashburton Place
Boston, MA 02108

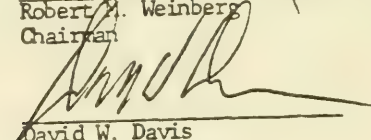
Dear Secretary Bewick:

Enclosed please find copy of our letter this date to Mayor Kevin White of Boston which we wish to have included in the administrative record as a further comment regarding the Final Environmental Impact Report for the Bird Island Flats Development.

Very truly yours,

MASSACHUSETTS PORT AUTHORITY


Robert H. Weinberg
Chairman


David W. Davis
Executive Director

February 12, 1981

The Honorable Kevin White
Mayor of Boston
City Hall
City Hall Plaza
Boston, MA 02201

Dear Mayor White:

We have carefully reviewed your letter to Secretary Bewick of February 6 and have discussed the matter with Massport staff participating in the project's development. We have also continued productive discussions with members of your Administration. At the outset, we want to assure the City that Massport continues to share the overriding concern that development of Bird Island Flats take place in the most environmentally sensitive manner possible. We believe that the project has been defined and discussed in the Final Environmental Impact Report with that criterion uppermost in mind. The City, of course, stands to benefit significantly from the development of BIF; at the same time, the City and its residents would be the principal parties bearing the brunt of negative environmental impacts that might otherwise accrue from BIF development. We are thus writing to you today to respond to each of the points you raised in your February 6 correspondence with Secretary Bewick. Moreover, in light of your announced notification of intent to litigate with respect to the project in the event that your concerns are not satisfactorily resolved, we wish to provide assurances which we hope will eliminate any need for litigation with respect to a project that promises such substantial gains for the City, its residents and the region as a whole.

1. Project definition: mixed use/cargo development.

While a range of alternatives was discussed in the Environmental Impact Report as is proper under the law, it is clear beyond doubt that the integration of the mixed use/buffer zone portion into the cargo and other aspects of the development is essential to the definition of this project. Indeed, the implementation of the mixed use and buffer development is necessary to achieve the required mitigation of environmental harm that might otherwise accrue from the project. Moreover, both the mixed use/buffer development and the cargo improvements are directly and

integrally related to Massport's airport objectives and its overall economic mandate as directed to the Authority under its Enabling Act.. As a result, to go forward with cargo improvements without a mixed use and buffer development would be to improperly segment the project.

Therefore, we share your commitment to the mixed use and buffer element of the BIF development as described in your February 6 letter. Towards that end, Massport will permit cargo operations on the eastern portion of the site which is designated for cargo use in the FEIR, but will not permit operations to commence on the western portion of the cargo development area, unless and until a developer has been designated and a binding contractual commitment for a mixed use and buffer zone development has been obtained, such development to be consistent with the FEIR. Thus, in making this commitment, Massport agrees with the City that going forward with both the mixed use and buffer development is an additional, essential mitigating step to protect the City and its residents from environmental damage which might otherwise be occasioned by development of BIF for cargo alone.

We believe that the Final Environmental Impact Report, especially as clarified and discussed in various comments and responses to comments generated throughout the comment period for the FEIR, is fully adequate in considering the potential environmental impacts of mixed use development, and, given the essential role which mixed use/buffer development must play in the mitigation of harm from the overall project, the designation of the developer and execution of binding contractual commitments to this portion of the site can be achieved in the reasonably near future.

Also crucial to the agreement which we have reached is that Massport and the City will continue their on-going discussions and achieve expeditiously further understandings regarding the definition of the first year construction program, the timing for contractual commitments and phasing of construction for the mixed use and buffer zone development, and further possibilities for mitigation.

2. Cargo building final design/orientation. Massport appreciates the concern of the City that the cargo buildings should be designed and oriented in a fashion which achieves maximum mitigation of possible environmental impacts while meeting the demands for improved cargo facilities. We strongly believe that the Final EIR as published is adequate in this regard and believe that comments received during the comment period from all parties have served to reinforce that position. At the same time, we recognize that further

steps to mitigate environmental harm might emerge in the next few weeks and months as the final specifications for the project are drawn up, and during this time, it is our intention to continue our on-going discussions with the City and other parties potentially affected by the cargo development to ascertain whether further such measures can be agreed upon by Massport. In doing so, of course, Massport would be operating on the basis of the Final Environmental Impact Report as published and commented on in the past few weeks, and in that connection, we believe that the City and the Port Authority should view the FEIR as a procedural and analytic basis for achieving our mutual environmental goals.

One such objective, of course, is that the later development of the western portion of the area designated for cargo development take place in a manner which optimizes the opportunities for further environmental mitigation. One promising option in this connection -- a possibility which was assessed by Massport as a design variant on the main east-west cargo building orientation selected in the proposed development plan -- was that of constructing a cargo building on a north-south alignment at the end of the main building. In response to your concerns, the Authority is today committing itself to construction of a cargo building on a north-south orientation at the westerly edge of the main building -- and will adopt this design detail as an additional, Section 61 mitigating measure which is reasonable and feasible -- unless, of course, the City and the Authority are able to agree on an operationally feasible alternative which is also a superior means of mitigating environmental harm. In doing so, the Port Authority recognizes that the adoption of this design strategy embodies a reduction of two, full (747) cargo positions (i.e., from eight such positions to six) and this reduction in positions is a key element in the further mitigation achieved by this approach.

3. Freight forwarders at BIF. Massport provided for the inclusion of buildings to house freight forwarders at BIF expressly in the interest of removing those activities from areas of the East Boston community where they are considered inappropriate and incompatible land uses for the neighborhoods in this area. We can understand, nevertheless, that the City has legitimate concerns over the effects that removal of forwarders may have in terms of the reuse of the parcels which they may vacate. Therefore, although this aspect of the issue is only indirectly related to the development of BIF (we note that the BIF development as proposed in the FEIR could accommodate only a handful of the more than forty forwarders currently located

off-airport), Massport is prepared to discuss other possibilities for forwarder locations in the Boston area, and will cooperate with the City in resolving these issues. Once again, as we arrive at understandings regarding additional strategies which would achieve relocation in a positive manner and should those involve Massport action, the Authority would be prepared to adopt such measures as additional steps to mitigate harm under Section 61 of MEPA.

4. General aviation activity at Logan. We believe that the Final Environmental Impact Report demonstrates the continuing concern of the Authority regarding potential adverse impacts from future general aviation activity at BIF, as well as from present activities which do impact the Jeffries Point neighborhood. For this reason, the impact report assesses the advantages environmentally of relocating GA activity away from the community and to a more appropriate site at BIF. Nonetheless, we will discuss additional options for location of GA activity, recognizing that many of these may be quite remote from the scope of the BIF environmental review. If additional measures to mitigate harm from BIF activities are agreed to be appropriate and feasible, Massport would follow through by adopting such measures as mitigating steps within the mandate of Section 61.

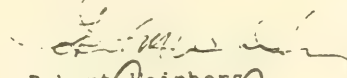
The City also expressed its continuing opposition to the construction of a so-called "GA/STOL 14-32" runway at Logan and recounted in brief the legal history associated with this earlier proposal. We believe that the Final Impact Report fully and carefully describes the legal history, agreements, and Section 61 findings made with respect to that earlier proposal, and thus adequately describes its current status.

5. City and community interest in additional mixed use development. The City and community have both expressed interest in possible further utilization of the BIF site for mixed use commercial development, especially in terms of areas of the site planned for later stages of cargo development. While we are willing to discuss the nature of the later phases of the development, it remains Massport's judgement that the cargo areas should proceed as described in the FEIR and as described in this letter today.

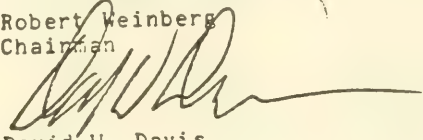
We trust that the assurances provided above respond to the concerns raised in your February 6 letter and in particular, reflects our basic agreement regarding the need for the mixed use development to provide mitigation of

environmental harm for the overall project. Therefore, we believe that our understanding should obviate any need for litigation over this project and trust that you will communicate with Secretary Bewick in this regard.

Sincerely,



Robert Weinberg
Chairman



David W. Davis
Executive Director

cc: Secretary John Bewick



DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

NEW ENGLAND REGION
12 NEW ENGLAND EXECUTIVE PARK
BURLINGTON MASS 01803

February 13, 1981

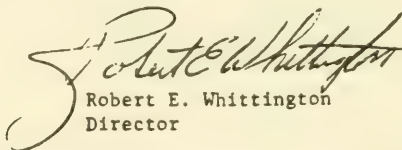
Mr. David Davis
Executive Director
Massachusetts Port Authority
99 High Street
Boston, Massachusetts 02210

Dear Mr. Davis:

In order to clarify any misunderstanding of FAA's position, let me state that nothing being proposed by Massport in its Bird Island Flats Environmental Impact Report would preclude the future construction of a non-precision instrumented, bidirectional STOL-GA Runway 14-32. The establishment of a full ILS with basic minimums would not be possible due to the existing cranes and possible shielding by buildings and aircraft parked in the approach area.

The operational flexibility gained by constructing this runway, with or without full instrumentation, should be compared in every respect (capacity, cost, environment, etc.) to a short extension of Runway 15L-33R as part of the Logan Airport master planning process. Additionally, the benefits of accomplishing both improvements should be considered.

Sincerely,



Robert E. Whittington
Director

Boston

February 13, 1981

Mr. David Davis, Director
Mr. Robert Weinberg, Chairman
Massachusetts Port Authority
99 High Street
Boston, Massachusetts

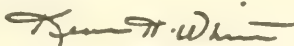
Dear Bob and Dave:

On the basis of the assurances which you have provided in your letter to me today, I am pleased to send to Secretary Bewick the enclosed letter.

As you have noted, the development of the mixed use and buffer zone portions of the project is an essential mitigating measure to protect the City as well as community residents from the environmental impacts which might otherwise flow from a project of this magnitude. Accordingly, this part of the development is the fundamental element shaping the City's evaluation of the integrity of the BIF project and its environmental review.

Based on our concurrence in this regard and on the assurances expressed in your letter, including our mutual commitment to arrive expeditiously at further understandings on certain detailed items regarding scheduling of contractual commitments and construction activities for the cargo and mixed use development, the City is withdrawing its notification of intent to sue and is waiving its rights to commence litigation on the adequacy of the EIS as long as the project moves forward as a joint development of the mixed use and buffer areas as well as the cargo portion of the project.

Sincerely,



Kevin H. White
Mayor

KHW/jc



Kevin H. White, Mayor / OFFICE OF THE MAYOR / Boston City Hall / City Hall Plaza G2201

A-4-17

Boston

February 13, 1981

Mr. John Bewick, Secretary
Department of Environmental Affairs
State House
Boston, Massachusetts

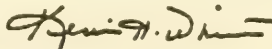
Dear Secretary Bewick:

Concerning my letter of February 6, 1981, I note the following. I have reviewed the record regarding the Bird Island Flats project as further developed by Massport during the extended comment period. I have received the assurances of Massport that the project will proceed only as a joint mixed use/cargo development. I have also received assurances from Massport that the City of Boston and Massport will, in the context of on-going discussions, reach further understanding regarding details of project phasing, staging, design details, and certain additional reasonable and feasible measures to mitigate harm.

Therefore, I urge you to find the EIS adequate for purposes of proceeding with a joint, mixed use/cargo project and if the project proceeds on that basis, the City of Boston waives its right to sue as described in its recent notification to that effect.

Finally, I feel the extra time accorded this review was adequate and productive to the City of Boston.

Sincerely,



Kevin H. White
Mayor

KHW/jc



February 13, 1981

Secretary John Bewick
Executive Office of Environmental
Affairs
One Ashburton Place
Boston, MA 02108


Dear Secretary Bewick:

The East Boston community through its many representatives has informed you of a series of concerns and criticisms as to the BIF project which the Massachusetts Port Authority is proposing. We have now another major cause for concern: that your office may be thinking of deleting the mixed use portion of the project, or making it very difficult or impossible for the community to pursue with the Port Authority.

The one thing about this proposal from the Port Authority that the East Boston community has agreed with is that the mixed use portion go forward as a necessary measure to mitigate harm from the rest of the development that may go on the site. We are not just interested in the buffer zone development, although that is essential also.

We hope that you will take our views most seriously as you come to your final decision regarding the environmental review process.

Sincerely,



Ms. Anna DeFronzo
Chairperson, East Boston
Land Use Advisory Counsel

MASSACHUSETTS PORT AUTHORITY

ROBERT M. WEINBERG
CHAIRMAN

99 HIGH STREET
BOSTON, MASSACHUSETTS 02110

February 19, 1981

HAND DELIVERED

Mr. John A. Bewick
Secretary of Environmental Affairs
Executive Office of Environmental Affairs
100 Cambridge Street, 20th Floor
Boston, Ma. 02202

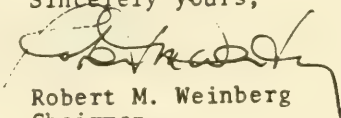
Dear John:

I was extremely encouraged by our discussion a few minutes ago. It is my understanding that you will consult with your staff and recontact me to discuss your specific concerns in regard to air pollution and traffic generation associated with the Bird Island Flats Development.

As I indicated to you, I am prepared to sit with you at your convenience and negotiate an acceptable solution to your concerns.

As you know, we believe the Bird Island Flats project is extremely important to the regional economy and believe that there are ways to deal with the concerns which you have about the project.

Sincerely yours,



Robert M. Weinberg
Chairman

RMW/es

massport

89 HIGH ST. BOSTON, MASSACHUSETTS 02110 (617) 482 2930 TELEX 94 0365

February 23, 1981

Secretary John Bewick
Executive Office of
Environmental Affairs
100 Cambridge Street
Boston, Mass. 02202

Dear Secretary Bewick:

As dissatisfied as we are with your statement of opinion regarding our Final Environmental Impact Report for Bird Island Flats we are even more puzzled by your stated rationale for that opinion. As you indicated, we have had virtually countless discussions among principals and staffs concerning the scope and content of the traffic analysis accompanying the cargo and mixed use aspects of the project. Our FEIR responded in full to your comments both during scoping and on the draft EIR submitted last summer. Moreover, during the extended comment period, our consultant, whose selection you recommended, provided the additional information you requested in order to clarify and confirm the appropriateness of assumptions used in the EIR traffic analysis. Your staff has acknowledged the adequacy of that clarifying and confirming information.

The role of the Secretary of Environmental Affairs at this stage of an environmental review process for a project such as EIR is to review and comment on the adequacy of our analysis pursuant to Section 62 et seq of the Massachusetts Environmental Policy Act. Succinctly stated, the question to be reviewed by the Secretary is whether our EIR is analytically sufficient in evaluating the impacts of the proposed action and in evaluating reasonable alternatives and reasonable mitigating measures. The answer is clearly yes in our view.

The essence of your comment in the form of an inadequacy determination is not that our analysis is insufficient, but rather that our choice among the alternatives analyzed of a particular development plan conjoining active mixed use

MASSACHUSETTS PORT AUTHORITY

Secretary John Bewick

-2-

February 23, 1981

with air cargo is somehow "wrong." That is, you state that you are "adamantly opposed" to the mixed use, and that you personally favor cargo development on a stand-alone, segmented basis.

Massport has taken great care to meet the spirit as well as letter of the Massachusetts environmental law as well as the National Environmental Policy Act, NEPA's federal companion statute. It was in this context that Massport entered into discussions with the City of Boston, the municipality which will bear whatever negative environmental impacts there will be from the BIF project, to reach an agreement on a full range of mitigating measures. It was clear that the mixed use buffer itself is regarded as the most fundamental measure of mitigation which could be adopted by the project proponent with respect to the entire BIF project. Thus our agreement with the City to propose a mixed use/cargo project was an acknowledgement by Massport that the project was conceived as an integrated one and that, while there may be some necessary project construction phasing, no attempt to segment the mixed use element from the cargo element would be made. This agreement not to segment may be regarded as very little more than a simple restatement of environmental law on project segmentation.

It is plain from these negotiations that the passive buffer is an alternative unacceptable to the City and the community and would be regarded by them as improper segmentation of the project. The economics of the passive buffer are also extremely unattractive for the airline industry. Your displeasure at our having failed to select what you characterize as "the [most] environmentally advantageous alternative", which must also be seen as an unrealistic alternative, does not in any way reflect on the quality of the EIR analysis of project alternatives. Indeed, you yourself indicate that we retained the analytic "flexibility" of a passive buffer in the EIR. Massport's failure to choose what you regard an environmentally advantageous alternative is not a proper basis for a declaration of EIR inadequacy.

Nevertheless, it is also within the spirit of NEPA that, even in our disagreement with you, Massport should make still another attempt to review the BIF project with you before proceeding with commencement or with litigation to confirm our position in this matter. To this end, then, we are notifying you in this letter that the Authority will resubmit

MASSACHUSETTS PORT AUTHORITY

Secretary John Bewick

-3-

February 23, 1981

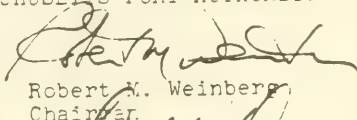
the BIF project to you for your formal review and comment regarding the adequacy of our analytic process. You suggest two possibilities for this further review, a revised FEIR or a Notice of Project Change. By one such or another technique, we will provide you with additional documentation for the record in this matter which will further address Massport's proposal for implementation of this project. We intend to provide this resubmittal to you within one week from today. Our willingness to do so is expressly based on your informal commitment to us that, if we resubmit the project, you will complete your review and provide your formal further comment regarding the project within one week of our resubmittal.

Finally, we are constrained to say that our notification today of our intent to resubmit the project is in no way to be construed as an acknowledgement that such a resubmittal is required or as a waiver of any of our legal remedies under the Massachusetts Environmental Policy Act or otherwise.

We trust that this matter can be resolved expeditiously.

Sincerely,

MASSACHUSETTS PORT AUTHORITY



Robert M. Weinberg
Chairman



David W. Davis
Executive Director

MASSACHUSETTS PORT AUTHORITY

99 High Street Boston, Massachusetts 02110

David W. Davis
Executive Director

February 24, 1981

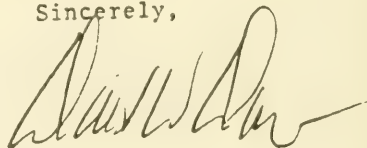
The Honorable Edward J. King
Governor of the Commonwealth
of Massachusetts
State House
Boston, Massachusetts 02133

Dear Governor King:

During the past week or so I've logged several calls to your office offering to meet with you to see if there's anything that we can do that would enable Massport to proceed with the Bird Island Flats project. I think that we would both agree that the project would represent needed air cargo capacity at Logan Airport, and I hoped that we could find a way to minimize what apparently are differences with respect to the various commercial developments which are proposed as an active buffer for the project.

I just want to repeat the obvious; If you feel that a meeting would be helpful, I'm certainly available.

Sincerely,



massport



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION I

J. F. KENNEDY FEDERAL BUILDING, BOSTON, MASSACHUSETTS 02203

February 24, 1981

Mr. Gerald D. Curtin, Chief
Airports Division
Federal Aviation Administration
New England Region
12 New England Executive Park
Burlington, MA 01803

Dear Mr. Curtin:

This letter is to follow up on our January 30, 1981 letter to FAA and your recent meeting with EPA staff and Massport concerning the impact of the proposed Bird Island Flats project on air quality.

We continue to be very concerned about the significant impact this project could have on air quality due to generated automobile traffic. As you know, we believe that the Environmental Impact Statement (EIS) did not contain sufficient information to allow a determination as to whether the project can proceed in compliance with the Clean Air Act. We are pleased that at the February 12, 1981 meeting agreement was reached on what steps need to be taken to develop the necessary information. It is our understanding that Massport will undertake the following activities:

- redo the air quality analysis using the year 1987 to accurately reflect the project's anticipated start-up year;
- revise the 8-hour CO impact analysis and include the receptors suggested by EPA;
- show that the project conforms with the Massachusetts State Implementation Plan, as required by Section 176(c) of the Clean Air Act, by demonstrating that the project will not create or exacerbate violations of the 8-hour CO standard, and by showing that the hydrocarbon emissions are consistent with the reasonable further progress requirement in the SIP;
- fully evaluate hydrocarbon and CO reduction strategies including a one-way toll system at the Callahan-Sumner Tunnel and Mystic River Bridge, traffic flow improvements at Logan, and vapor controls at jet fuel storage tanks;
- re-examine replacement parking options to offset the new 1800-space facility in accordance with the parking freeze.

Since the information described above is necessary to determine which components of the project should proceed and what mitigation measures will be necessary,

we request that you continue to hold in abeyance your Record of Decision. Once the work has been completed, I suggest a meeting be held to discuss the results and how to proceed from that point.

I appreciate your cooperation and look forward to working with you to resolve these issues. Please let me know if you have any questions or wish to discuss this further.

Sincerely,



Richard R. Keppler
Acting Director
Environmental Impact Office

cc: Norm Paramelli, Massport ✓
Sam Mygatt, MEPA Office



The Commonwealth of Massachusetts

Executive Office of Environmental Affairs

100 Cambridge Street

Boston, Massachusetts 02202

EDWARD J. KING
GOVERNOR

JOHN A. BEWICK
SECRETARY

February 27, 1981

David W. Davis, Executive Director
Robert M. Weinberg, Chairman
Massachusetts Port Authority
99 High Street
Boston, MA 02110

Dear Messrs. Davis and Weinberg:

I have reviewed your letter of February 23, 1981, and despite the disagreements regarding the various issues surrounding the Bird Island Flats development, I am encouraged that you are considering revising the FEIR or submitting a Notice of Project Change. The objective of the statutory environmental review function of this office is to guarantee that an adequate effort has been made to describe the environmental impacts of proposed projects and to propose mitigating actions where the impacts are significant and severe.

I believe that Massport has made important strides in recent weeks towards the identification of the magnitude of the traffic-related impacts of development at Bird Island Flats. We agree with your data showing that in the absence of mitigating actions, the intersection of Cross Road and the exiting airport traffic will be 39% over capacity. These figures demonstrate very severe congestion but also assume that 418 additional vehicles in the peak afternoon hours will use Porter Street to exit from Bird Island Flats to reach the Callahan Tunnel. If the Bird Island Flats access is designed to reduce impacts on Porter Street and Jeffries Point, these vehicles would be added instead to the demand at the critical Cross Road/access road intersection, increasing the over-capacity condition from 39% to 69%. Such projected overloading of existing intersection capacity is highly significant and should be a major concern to all parties, since airport congestion is not in the interests of good airport operations or of a healthy urban environment.

February 27, 1981

Several consequences of such excessive traffic demand are that existing airport trips would not be made or would be delayed; that a massive amount of traffic would seek local street access to Bird Island Flats, to avoid congestion and traffic backups on the access roads; that existing bus and transit service to the airport would be impeded; or that the development itself would not be a success because of the significant limitations on highway access. Because the peak periods of airport traffic have been gradually lengthening as peak hour congestion becomes more evident, there are also limitations on the ability to schedule airport-related and non-airport related activity in such a manner as to avoid peak periods of congestion.

As you know, the staffs of our respective agencies have worked assiduously to carry out their respective functions, so that a workable project could emerge which meets the needs of the airport and of industry and does not impose new environmental burdens on the community. Indeed, when the deficiencies in the traffic analysis of the Final EIR were recognized, we worked together to have them addressed without starting anew the review and comment period. Even as these efforts to address traffic deficiencies were proceeding, Massport was negotiating an agreement with the City of Boston which implied support for the full extent of the Mixed Use development. Unfortunately, the City did not have the benefit of the new traffic information when they made such commitments and thus may have supported the full mixed use development without full appreciation of the traffic and related environmental impacts on East Boston.

Thus far, the EIR concludes that improvements in the airport roadway system will be necessary in any event by 1985, and that BIF development will simply advance that date by a year or two. There is an assumption that improvement of the airport roadway system will solve the capacity problem engendered by Bird Island Flats. This appears to be incorrect, however. Our analysis suggests (this should be confirmed by your investigation) that construction of a U-turn loop east of the access road/Cross Road intersection will yield a 10% improvement in intersection capacity, but that construction of a full Cross Road overpass -- the most extreme solution I have heard advocated -- will only yield a further 3% improvement. This being the case, what else, short of down-sizing or eliminating the mixed use, can solve your capacity problems? Note that the same corrections, without mixed use, would appear to remedy the situation until approximately 1991.

An additional problem is the off-airport capacity limitation. The critical Tunnel/Artery NB merge, today 1% over capacity, will be 15% above capacity by 1987 without BIF development, and 23% (a further 50% increase) above capacity with BIF development. Your package of mitigating measures would reduce this to 19%. For a major regional transportation link, this is

February 27, 1981

an unprecedented increase in congestion. It has particularly grim air pollution implications, where backed-up traffic will extend into the tunnel. I believe Massport has a responsibility under MEPA to face this issue squarely and to deal with it.

The Jeffries Point community, among others, has a stake in the outcome of this issue. The neighborhood is intensely impacted by the airport at present, and it is essential that those impacts, taken together, not be increased by the development of Bird Island Flats. Cynical observers might suggest that massive congestion of the airport access roads would result in reduced growth of air traffic and thus less aircraft noise. This is in no one's best interests, though, and it is clear that the community would suffer greatly from the impacts of the street congestion.

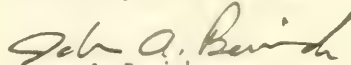
Although Massport may believe that Federal review of the BIF project has been completed, I understand that this review has yet to be concluded and that Massport must, by agreement with EPA and FAA, revise the air quality modeling, and then discuss additional mitigating measures. This analysis and discussion, including consideration of SIP compliance, should receive MEPA review.

In closing, I appreciate your desire to complete the MEPA process. My suggestion of a Notice of Project Change, and offer of a one-week turnaround time, were predicated upon the assumption that Massport would re-examine its project mix and build no more of the non-aviation components than can be accommodated by the region's transportation systems. An offset policy, by which Massport would add new traffic only when it has succeeded in reducing other traffic, might be an option, although challenging to implement. Of course, any phasing of development must recognize the need for early commencement of some type of noise barrier and address how construction of this barrier can be assured.

Without a significant project change, Massport should recognize that refiling a Revised Final EIR will necessitate inclusion of all supplementary material developed since the submission of the original Final EIR. Furthermore, the statutory public review periods should be complied with, including response to public and agency comments.

I believe that Massport realizes that traffic congestion is a significant issue related to mixed-use at Bird Island Flats, and that specific actions to reduce the future of traffic loads at the airport must be detailed. Whatever course Massport chooses to follow, I ask that primary emphasis be placed on impact reduction coupled with effective and feasible mitigating actions.

Sincerely yours,


John A. Bewick
Secretary

By Hand

cc: Mayor Kevin White
EPA
DEQE
EBLUAC



massport

99 HIGH ST. BOSTON, MASSACHUSETTS 02110 (617) 482-2930 TELEX 94-0365

March 4th, 1981

Mr. Merrill S. Hohman, Director
Air and Hazardous Materials Division,
U.S. Environmental Protection Agency
J.F.K. Building
Boston, Massachusetts 02203

Subject: Determination of Prevention of Significant
Deterioration Applicability and Non-Attainment
New Source Review Requirements for the Bird
Island Flats Development Project

Dear Mr. Hohman:

Since your last communication with our air quality consultant (Mr. Chng of Bolt Beranek and Newman Inc.) on February 29, 1980, a few changes in the proposed uses and associated stationary sources for the Bird Island Flats (BIF) have been noted. These were spelled out in both the Draft and the Final EIS, and have been discussed with your staff. We would now like your confirmation that EPA requirements for non-attainment pre-construction new source review are not applicable to this project for the reasons outlined below.

Massport's preference for space heating at BIF is still to buy natural gas from an existing utility. However, if gas is unavailable, then a possibility exists that a new power plant may be constructed that may be forced to burn oil to provide the necessary heat for the development. Secondly, Massport is also considering the construction of a 500,000 - gallon jet fuel and a 25,000 - gallon Av gas storage capacity at BIF. Possible emissions from both a new power plant and jet fuel/or gas storage facilities were included in the inventory underlying the air quality analysis as contained in the Final EIS/EIR. However, the relationship of these two stationary sources to the PSD and non-attainment and new source review should be clarified. We would like to present our assessment below and seek concurrence from your office.

We estimated potential emissions for the existing power plant and the proposed plant under the assumption of all oil and all gas firing. These estimates, as shown in the attached table, are based on uncontrolled emissions with emission factors taken from EPA's AP-42 document. As indicated by these estimates therefore, the existing plant is not a "major" source. Based on the status of this existing plant and estimated

(uncontrolled) emissions of the proposed new plant, we believe that the new plant would be exempt from PSD applicability, and we request your confirmation that our understanding is correct.

With respect to the issue of non-attainment new source review, we understand, based on consultation with Ms. Linda Murphy's office, that Boston is in attainment with respect to the SO₂ and NO₂ standards, unclassified with respect to TSP, and in non-attainment with respect to CO and ozone. Therefore, the only two pollutants that are of concern here are CO and HC. Emissions of these two pollutants from the new power plant - even under the worst assumptions (i.e., firing with oil and uncontrolled) - do not approach the criterion levels. Based on these estimated emissions and the attainment status, it is our belief that the proposed new plant, would be exempt from new source review and pre-construction permitting processes, and emissions offsets requirement.

The attached table also shows the estimated uncontrolled total hydrocarbon emissions for the proposed jet fuel storage tanks. We would therefore request a confirmation of PSD non-applicability and new source review/permitting, and emissions offset requirements for the storage facility. Additionally we would need your advice as to the applicability of New Source Performance Standards to the proposed fuel storage facility.

Sincerely yours,

MASSACHUSETTS PORT AUTHORITY



Norman Faramelli
Director of Planning

Enclosure

c.c.: Harley Laing

NF/pl.

ESTIMATED ANNUAL EMISSIONS FROM
EXISTING AND PROPOSED POWER PLANTS
AND PROPOSED FUEL STORAGE FACILITY

	Type of Fuel	Annual Fuel Rate	Emission in Tons/Year				
			Particu- lates	SO ₂	CO	HC	NO _x
Emission Factors (gas in lb/10 ⁶ ft; oil in lb/10 ³ gal)	gas	-	5-15	0.6	20	8	10-120
	oil	-	23	157	4	3	40-80
Existing Plant	oil	1,235	14.2	97	2.5	1.9	24.7-49.4
	gas	386,000	1.0-2.9	0.12	3.9	1.5	15.5-23.2
TOTAL	-	-	15.2-17.1	97.1	6.4	3.4	40.2-72.6
Proposed Development Using Gas	gas	160,000	0.4-1.2	0.05	1.6	0.6	6.4-9.6
Proposed Development Using Oil	oil	1,120	12.9	88	2.2	1.7	22.4-44.8
Proposed Fuel Storage at BIF	jet fuel & Avgas	(See FEIS)	-	-	-	120.7	-



massport

100 HIGH ST. BOSTON, MASSACHUSETTS 02110 (617) 482-2930 TELEX 94-0365

March 10, 1981

Mr. John Driscoll, Chairman
Massachusetts Turnpike Authority
Prudential Center
Suite 3000
Boston, Mass. 02199

Dear Chairman Driscoll:

With regard to our discussion last week concerning the simultaneous adoption of a one-way toll on our facilities, let me offer the following. We are now updating the previous studies done on the possible impact of one-way tolls on Massport facilities. We should sit down with you soon to discuss the possibility of a two-three month experiment. We feel that a one-way toll policy should be adopted only after a successful experiment is conducted. It is impossible to anticipate the traffic diversion that might occur with such a toll collection procedure unless an experiment is carefully monitored.

The concept of a one-way toll has surfaced recently on several occasions including comments by the U.S. Environmental Protection Agency which is concerned about air quality in the region. Massport is willing to consider an experiment for our facilities and looks forward to working with you to coordinate schedules for a simultaneous effort with the Turnpike Authority. Only after such an experiment, will the traffic and air quality impacts be better understood.

Sincerely,
MASSACHUSETTS PORT AUTHORITY

DAVID W. DAVIS
Executive Director

c.c.: Secretary Barry Locke
Ken Pearson

DWD/pl.

A-4-33

MASSACHUSETTS TURNPIKE AUTHORITY

SUITE 3000, PRUDENTIAL CENTER

BOSTON, MASSACHUSETTS 02199



JOHN T. DRISCOLL, CHAIRMAN
DAVID R. NAGLE, VICE-CHAIRMAN
PAUL F. MAY, MEMBER

536-1400

March 20, 1981

Mr. David Davis
Executive Director
Massport
99 High Street
Boston, Massachusetts 02110

Dear Dave:

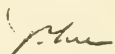
In response to your letter of March 10th regarding a study by our two Authorities of one-way tolls it would appear to be an inopportune time at present.

Our staff reminded me that reconstruction of the deck in Chelsea leading to the Tobin Bridge is going to commence soon. That would make it impossible to get an accurate analysis from a two to three month experiment at this time.

I would suggest that we consider this again when the reconstruction is completed and when traffic patterns return to normal.

In the meantime, a few legal questions have surfaced which I plan to forward to our General Counsel for opinion.

Very truly yours,


JOHN T. DRISCOLL
Chairman

JTD/wmm

CC: Secretary Barry Locke
Under Secretary James O'Leary

Bolt Beranek and Newman Inc.

24 March 1981

Massachusetts Port Authority
4th Floor Old Tower Building
Logan International Airport
East Boston, MA 02128

Attention: Claire Barrett

Subject: Brief Discussion of Noise Descriptors
and Their Appropriateness to
Transportation Noise Sources

Daer Claire:

In this letter I attempt to respond to your request for simple descriptions and discussions of various noise descriptors or metrics. In the following paragraphs I discuss three basic types of descriptors:

- Maximum (or very short-term) A-weighted sound levels;
- Percentage (A-weighted) levels;
- Equivalent (energy average A-weighted) levels.

Each type of descriptor is defined, some common uses given, and a few of the strengths and weaknesses of its use discussed.

Maximum A-Weighted Levels

The maximum A-weighted level for a given "noise event" is simply the maximum level that would be read by a calibrated standard sound level meter (with A-weighting electronic network) during the course of the event. (Note that the maximum indicated by such an instrument can vary for a given event depending upon which "meter response characteristic" is selected.) Maximum levels, consequently, are very easy to measure, and it is fairly easy to develop an intuitive "feel" for how loud an event is, based on its maximum A-weighted level.

Maximum A-weighted levels have been used to quantify the noise of a single type of noise event - e.g., a motor vehicle passby. (Note that distance from the noise source to the measurement point must always be specified.) Combined with a knowledge of the level of the "background" noise, one can roughly estimate whether or not the event will be detectable. Maximum A-weighted levels are also used to develop mathematical models for computing the A-weighted levels that will be produced by operation of a noise

source; as, for example, the maximum A-weighted sound levels measured at 50 ft. (emission levels) were used to help model the noise produced by taxiing aircraft at Logan.

The main weakness of the maximum A-weighted sound level is that by itself it can not tell us much about how people will judge a noise environment. We need to know how often the maximums occur, and, at least implicitly, we must know the general time history of the noise: is it a very short duration noise, or does the noise level rise relatively slowly to the maximum and drop back again.

Percentage Levels

These are the descriptors that identify A-weighted levels that are exceeded for a specified percentage of the time during a stated period. Common percentage levels are the 10% (abbreviated L_{10}), 50% (L_{50}), and 90% (L_{90}) levels for a one-hour period. The L_{10} value for a given noise source is the sound level that is exceeded for 10% of the time (usually an hour), the L_{50} is the level exceeded for 50% of the time, the L_{90} is the level exceeded 90% of the time.

In the past, these percentage levels have been used to describe community noise environments, and to predict future, highway traffic produced, noise levels. The L_{10} level, especially, has been used for study of highway noise levels. Lately, however, these descriptors seem to be less and less used in favor of the energy average or equivalent levels. This change in preference is probably due to three factors: the percentage levels are more difficult to predict than are the equivalent levels; many measuring instruments are now available to measure equivalent levels; equivalent levels have been found to correlate with community response to noise as well as, if not better than, the percentage levels.

One significant weakness of the percentage level is that they are difficult to predict. Accurate prediction requires the use of very involved mathematical models. Not only are such models difficult to develop, but they are so complicated that it is very difficult to acquire an intuitive "feel" for the results, to know what changes in noise level will result for given changes in noise source operation. For example, a doubling of the number of noise events (e.g., number of departures per hour) does not necessarily result in a 3 dB increase in L_{10} .

Equivalent Levels

The equivalent level of a noise source is the A-weighted sound level that accounts for all sound energy produced by that source. The equivalent sound level during a stated time period for a given noise source is the level of a steady sound that has the same sound energy as does the actual time-varying sound produced by that noise source.

The equivalent level may be used to describe sound levels for any specified period of time. Currently, three basic equivalent levels are used: the hourly equivalent sound level; the 24-hour equivalent sound level; and the day-night average sound level. The hourly equivalent level applies to a specified hour, the 24-hour equivalent sound level applies to a specified 24-hour period, and the day-night average sound level applies to a specified 24-hour period, but contains a 10 dB penalty for nighttime (generally 10pm to 7am) noises.

Equivalent levels now seem to be used for most transportation noise problems. Relative ease of computation, documented relationship with community response, and relative ease of measurement all tend to make equivalent levels the preferred type of descriptor.

A short-coming of the equivalent level is that for some noise problems, the lay public seems to have difficulty relating personal experiences with noise levels to the equivalent, energy average sound level. For noise sources that produce very high sound levels of relatively short duration, the equivalent sound level is typically considerably lower than the maximum A-weighted sound level produced by the source. Aircraft operations can easily produce maximum A-weighted sound levels in the community of 100 dB or more, but the associated equivalent level (day-night sound level, for example) may not exceed 80 dB. However, even though the public may have difficulty understanding such differences in levels, the fact remains that community response to noise corresponds fairly well with equivalent levels, and equivalent levels can be computed with reasonable reliability.

* * *

I hope these are the types of discussions you are looking for. I do not mean to imply that the three general descriptors are the only ones that have been used or that I have exhaustively discussed these three. In fact, for the past decade or more, considerable effort has been devoted to developing and testing various descriptors. For transportation community

Claire Barrett
Massachusetts Port Authority
Page 4.

noise problems, however, most current environmental assessments tend to be undertaken in terms of the equivalent level descriptor.

If you wish to discuss community noise descriptors further, please give me a call.

Very truly yours,

BOLT BERANEK AND NEWMAN INC.

N. P. Miller

Nicholas P. Miller

NPM:kj



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION I

J. F. KENNEDY FEDERAL BUILDING, BOSTON, MASSACHUSETTS 02203

March 31, 1981

Mr. Norman Faramelli
Director of Planning
Massachusetts Port Authority
99 High Street
Boston, MA. 02110

Dear Mr. Faramelli:

This letter is in response to your March 4, 1981 request concerning the applicability of the PSD and nonattainment review programs to the Bird Island Flats (BIF) project. Based on the emissions calculations you submitted, it has been determined that the existing plant's emissions are less than 100 tons per year, and is therefore not considered a major stationary source for nonattainment (or PSD) purposes. Since the proposed source's emissions increases are also less than 100 tons per year and 250 tons per year for nonattainment (CO and ozone) and PSD (TSP, SO₂ and NO_x) respectively, it would not be subject to a new source review under either program.

However, if the storage tank is also constructed, and its VOC emissions are greater than 100 tons per year, then it would be subject to a nonattainment review. Also, since the tank would have a storage capacity greater than 40,000 gallons, it would be subject to the new source performance standards for storage vessels (40CFR Part 60, Subpart Ka). For additional information on these programs (nonattainment and NSPS), please contact the MA DEQE, Division of Air Quality Control. If you should have any questions concerning the PSD program, please contact John Courcier at 223-4448.

Sincerely yours,

Merrill S. Hohman, Director
Air & Hazardous Materials Division

10 Moulton Street
Cambridge, MA 02238
Telephone (617) 491-1850
Telex No. 92-1470

Bolt Beranek and Newman Inc.



15 April 1981

Massport
99 High Street
Boston, MA 02110

Attention: Richard Marchi

Subject: Noise Reducing Effects of High Buildings
Along Western Edge of Bird Island Flats

Dear Dick:

At your request, I have investigated the possible noise reducing effects of very high buildings/barriers (70 ft. to 130 ft. high) located along the western edge of BIF. I have used the basic noise barrier computation method and the wind effect method that we used for the BIF EIS/EIR. The following table presents the results of my calculations.

BUILDING/BARRIER HEIGHT	NOISE SOURCE LOCATION 1		NOISE SOURCE LOCATION 2	
	Δ dB	WIND SPEED	Δ dB	WIND SPEED
40 ft.	6 dB	0.2 mph	5 dB	0.1 mph
70 ft.	12 dB	0.9 mph	10 dB	0.5 mph
100 ft.	17 dB	1.5 mph	15 dB	0.8 mph
130 ft.	20 dB	2.2 mph	19 dB	1.2 mph

The left-most column gives the height of the building/barrier as feet above ground. The other columns present the noise and wind related effects for an airplane located at either of two different positions: Location 1 is a point on either the taxiway or apron midway along the major east-west building on BIF; Location 2 is at the easternmost end of the proposed BIF development, about where the Bravo Apron is presently located.

Richard Marchi
Massport
Page 2.

The columns labelled "ΔdB" are the no-wind noise reductions that would result at a 3rd floor window in McCormack Square if buildings/barriers of the specified height were constructed. These reductions apply to the noise produced by an airplane positioned at either Location 1 or Location 2, and are reductions with respect to a no building/barrier configuration.

The columns labelled "Wind Speed" give the estimated minimum wind speed for winds from the east required to just eliminate the noise reducing effect of the building/barrier of the specified height. In other words, it is the wind speed that will bend the sound waves enough so that they propagate over the top of building/barrier and down into the Jeffries Point community.

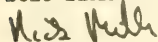
Though I judge our prediction models, especially wind model, as rather imprecise for the very long distances of these scenarios, I believe the basic conclusions are accurate: namely that very low speed winds, blowing from the east, will almost completely eliminate the noise reducing effects of even tall buildings/barriers for planes in the general BIF vicinity. In other words, I do not think we should necessarily expect that an east wind of exactly 0.9 mph will eliminate the 12 dB reduction provided by a 70 ft. high building for a Location 1 noise source. Rather, we should conclude that winds of less than 5 mph from the east will probably eliminate any noticeable barrier noise reduction provided by a building that is less than several hundred feet high.

As we have discussed, however, such wind produced degradation of barrier effectiveness is not expected for aircraft located in the vicinity of the Eastern Airline shuttle gates. In this general area, the large terminal buildings should disrupt the wind flow so that no smooth profile of wind speed with elevation will exist, and simple bending of propagating sound should not occur. In other words, the high buildings/barriers should provide useful reduction of the noise produced by taxiing Eastern jets.

I hope this is the information you need. If you have any questions, please give me a call.

Very truly yours,

BOLT BERANEK AND NEWMAN INC.



Nicholas P. Miller

NPM:kj



APPENDIX A-5 - Secretary's Press Release
and Comments on FEIR plus MEPA Staff
Comments



NEWS

EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS

EDWARD J. KING, GOVERNOR
JOHN A. BEWICK, SECRETARY
100 CAMBRIDGE STREET, BOSTON, MASSACHUSETTS 02202
617 727-9800

FOR IMMEDIATE RELEASE
FRIDAY, FEBRUARY 20, 1981

CONTACT: GREGG WILSON
727-9800
277-1367

SECRETARY JOHN A. BEWICK'S STATEMENT ON BIRD ISLAND FLATS

This afternoon I have notified Massport officials that following an extensive public review process I have decided the final environmental impact report for the proposed Bird Island Flats Development is inadequate.

Information supplied by Massport during the extended comment period shows that by 1987 the additional traffic generated by the mixed-use portion of the Bird Island Flats plan will seriously overload airport roadways and the tunnels linking the airport with downtown Boston. This overload will mean extended traffic congestion periods, longer traffic backups and congestion which will affect traffic flow on intersecting roads. The Massport final impact report freely acknowledges that the proposal to construct office and industrial space on Bird Island Flats will tax the airport roadways well beyond their capacity.

Every motorist who has endured the stop and go traffic on the airport roadways and in the Sumner and Callahan Tunnels knows that during peak hours no additional capacity exists to handle the additional traffic which would be generated by Massport's

-more-

A-5-1

mixed-use development plans. The overcrowding of airport roadways is a serious threat to air quality. The area on the East Boston side of the tunnels is already a "hot spot" of air pollutants. The additional traffic generated by the mixed-use project will make an already serious air quality problem intolerable.

As the state's chief environmental official charged with the care and protection of our environment, as a public official who is concerned with maintaining the fragile air quality of our city, I am adamantly opposed to the Massport mixed use plan. The Massport proposal to construct office buildings, light manufacturing space and parking in an area which is already oversaturated with transportation intensive activity is environmentally unsound.



The Commonwealth of Massachusetts

Executive Office of Environmental Affairs

100 Cambridge Street

Boston, Massachusetts 02202

EDWARD J. KING
GOVERNOR

JOHN A BEWICK
SECRETARY

CERTIFICATE OF THE SECRETARY OF ENVIRONMENTAL AFFAIRS

ON

FINAL ENVIRONMENTAL IMPACT REPORT

PROJECT NAME: Bird Island Flats

EOEA NUMBER: 03587

PROJECT PROPONENT: Massport

DATE NOTICED IN MONITOR: December 8, 1980

The Secretary of Environmental Affairs herein issues a statement that the Final Environmental Impact Report submitted in the above-referenced project does not adequately and properly comply with Massachusetts General Laws, Chapter 30, Section 62-62H inclusive, and the regulations implementing MEPA.

Information generated during the extended comment period demonstrates that the traffic generated by the mixed use portion of the development will overload the capacities both of the airport roadway system and the roadways linking the airport to downtown Boston. An Environmental Impact Report must not only describe the impact on the environment of the activity it studies, but must also explore measures to minimize or avoid such impacts. Although the EIR and materials submitted during the extended comment period discuss traffic mitigation measures such as flexitime, shuttle bus loops, and even a hypothetical cross-harbour ferry, such measures are ineffectual to solve the basic problem. Although there does not now exist adequate capacity to carry traffic during the afternoon peak hours from the airport back into Boston, southbound and westbound, Massport now proposes to build on the airport office space and industrial space tantamount to a major new industrial park and office building. Where will the traffic go?

Massport freely admits that the on-airport roadway system will be taxed above capacity; it says that it will redesign and rebuild that system (in ways not evaluated in the EIR) before the big new traffic streams come on line in 1984-1987. This does not solve the problem, though, of getting that traffic on to or off of the airport. There is not now capacity to carry the existing traffic, as any rush hour motorist in the Sumner Tunnel will attest. By 1987, even without the office building and industrial park, ordinary growth will increase airport traffic by 20%. No plans are underway to create new capacity.

Despite this lack of road capacity, Massport has proposed new development in the form of office space, which will generate a high percentage of automobile commuters, and a "convention hotel," in a city which is experiencing an unprecedented boom in new hotel room construction.

The "mixed-use buffer" is touted as a measure to mitigate environmental impacts of aviation development on Bird Island Flats. The EIR demonstrates thoroughly that a noise buffer is necessary. Such a buffer, though, can be either a passive buffer, a wall, which generates no traffic and has the same noise reduction benefits, or an active buffer, buildings which generates high levels of additional traffic, noise and air pollution.

During the review period I have explained concerns about traffic repeatedly to Massport and have suggested that changes in the mix of the project be evaluated as mitigating measures. An obvious option would be the use of a passive buffer that minimizes increased road traffic from the project. In response Massport has eliminated the flexibility it retained in the EIR (where it studied both passive and active buffer options) by agreeing with the City that the active buffer will be selected. This agreement, filed with me during the extended review period, constitutes a decision by Massport that it will not select the environmentally advantageous alternative of a passive buffer. Thus, I am left with no alternative but to declare the Environmental Impact Report inadequate, both for failure to describe fully the impacts of the proposed activity, and for failure to study adequately the environmental benefits of the passive buffer, as compared to the active buffer.

These concerns, as well as certain of the public and agency comments received during the review period, must be responded to either by a revised Final EIR, or by project changes committed to in a Notice of Project Change pursuant to MEPA Regulation 10.16. My staff will be available to meet with Massport to discuss these issues.

3.20.81
DATE

John A. Bewick
JOHN A. BEWICK, SECRETARY

Part I - The Major Noise Problem

MEPA has requested that Massport use noise level monitoring and modeling which would give a more accurate evaluation of the noise impact of the airport activities on the adjacent and surrounding communities. The Final EIR has gone part way by presenting data but has not used the data to evaluate fully the potential impacts of this project. Lmax and frequency data is presented for Bremen Street on page B-44, and for Jeffries Point on page B-40. On page B-50 Lmax is given for trucks 70-75 db, for cargo aircraft 75-80 db and for Eastern/US Air gets 85-90 for some point on BIF. No frequency of these impacts is included. Lmax in Jeffries Point includes take off levels of 73 to 90 dB (figure B 1-3), taxiing Eastern jets 75 to 80 dB, and local traffic 68 to 83 dB (Figure B 1-4). Here again no frequencies are given. With the variation in presentation and content, meaningful conclusions are difficult to reach and are left for the "reader" to make. When the significance of impacts is discussed in the FEIR Lmax and the sporadic L10 data are not considered.

The EIR states on page B-8, ".....equivalent sound level is the primary descriptor used in this report. These are of 3 types"Ldn for broad comparisons of alternatives." To identify day vs. night problems "both average day time and average nighttime hourly equivalent sound levels are presented." "...this study also provides information on resultant maximum A-weighted sound levels, Lmax, and on 'time-above', these two additional descriptors are provided to give readers an alternative, if somewhat limited, method of assessment."

The Leq and Ldn data are analyzed and mitigation measures considered and evaluated on that basis; but the two additional descriptors are not. To cite a comparison which illustrates the difference these measures can make in terms of decibels, Ldn for Castle Island 1977 (see figure B-1 and figure 6 of the Logan Generic Draft) is approximately 75 db while the Lmax ranges from 79 to 95 dB for 14 types of aircraft (median 90), (see P. 32, table 13 of the Draft Logan Generic Report). From elsewhere in the FEIR, such flyovers create a large impact, probably in L10 for about 1 1/2 minutes per plane. Thus, I feel it is imperative that the Lmax or L10 level of environmental impact for operation, construction and mitigation, be evaluated. Do the levels of mitigation change? Tables similar to that on B-44 should use Lmax and L10 to indicate So. Boston impacts, and figures similar to B-1 should be presented for existing levels, Low Cargo (using both BIF to the North Apron), the proposed alternative and any other alternatives developed to minimize impacts. Additionally the EPNL levels (Effective Perceived NOise Level) used to calculate other descriptors in the FEIR should be fully described and considered as a means of evaluating the impact of airport operations on the surrounding populations.

The number of new cargo flights should be clarified. Six are mentioned repeatedly in the FEIR while tables B 1-6 and B 1-9 indicate 9 additional cargo flights. The Tables which summarize noise impacts should include the 3 dB penalty identified as appropriate in the FEIR. The discrepancy between 25 construction trucks creating an Leq of 60 dB (p. 4-17), while 1200 additional day trucks to BIF = 59 dB and 800 night trucks = 53 dB (pg. 7-4) should be explained.

In analysing the noise impacts of year 2000 passenger flights, the fact that 2X the present weight in cargo would be in the belly hold apparently was not included as a factor. Since take off weight is significant to noise generation, the effect of not including such data should be evaluated. A-5-5

Part II. Minor Problems Throughout the Report and Appendix

Page 5-6. Was the noise analysis for the 800 night time trucks conducted as if concentrated between 10 PM and midnight?

Page 5-7. Are the present noise exceedances for Jeffries Point and Bremen Street due to traffic, ground or flight aircraft operation?

Page 5-7. 2nd Paragraph should also include the statement that the 3dB pure tone penalty must be added.

Page 5-7. Results add -- if the appropriate mathematical adjustments are done.

Page 5-7. Comparison needs to be made to existing conditions as well as to the revised no build.

Page 5-10. Why is their no truck evaluation at the North Apron?

Page 5-17. Why is no comparison made to existing conditions?

Page 5-18. Last Paragraph. To what extent can traffic be reduced and by which methods? Are these proposed mitigation measures?

Page 5-20. It is not clear how strong the effort to reduce energy consumption will be. Is this part of the mitigation?

Page 5-23. This EIR should contain the binding commitment to the buffer zone now, not at the time of significant air cargo activity.

Page 1-3. Why is the increase by 800 tons per day in mail handling not included in the cargo increases elsewhere in the report?

Page 1-6. Table 1.3-3 indicates 20-40 thousand square feet available in the Southwest Service Area for cargo. Is any of this area planned for that use? If so, what kind of cargo activity?

Page 1-7. Will the new Helipad location increase noise levels in So. Boston?

Page 1-11. How can construction of the buffer begin before cargo operations commence to any great degree when 50% of the cargo, 100% of the itinerant cargo and 50% of forwarder belly cargo facilities will be completed or under construction? I understood their construction would be easy and rapid and that operations could be switched to the new facilities quickly.

Page 2-17. The North-South Cargo Building alignment could reduce cargo noise impact by 3dB. This was dropped as not significant even though the proposed active or passive 40' barrier will not reduce eastern BIF cargo operations noise. Why shouldn't this be reconsidered now?

Page 2-29. 2nd Paragraph. Alternations should be alterations.

Page 4-5 through 10. The 3dB pure tone penalty should be included in these tables.

Page 4-24. The NO₂ statement is suspect.

After Page 4-30. Fig. 4.2-6 does not give existing levels.

Page 4-31. The maximum 1 hour HC concentrations is estimated at 9 mg/m³ but figure 4.2-7 shows a maximum of 7 mg/m³. This should be corrected as the figures are often used as a summary of the data.

Page 4-31. What is the max projected HC concentration and where? HC increases 16.9% over existing conditions from Table 4.2-3.

Page 4-31. Where has it been shown that the odor problem is proportional to the total HC concentration?

Page 4-32. CO over existing conditons should be HC.

After page 4-32. Figures 4.2-10 should show existing levels.

Page 4-34. What is the truck level of NO_x for the proposed development plan without GA?

After 4-35. Figure 4.2-14 should show existing for each case.

After 4-37. Figure 4.2-18 should show existing levels for each case.

Page 4-47. Table 4.2-13 does not contain existing conditions.

Page 4-76. With such savings in energy possible, what will the Massport stance be if conservation is not mandated?

Page 4-87. The 300 commercial spaces should be clarified as non-employee public parking space.

Page 5-3. If the development reached that suggested on Page 1-11 by 1983 the permanent access road may be needed prior to 1985.

Page A-5. The data for existing conditions is not presented in table A-2-1. Also no automobile traffic is projected for cargo operations employees. From elsewhere in the report, there should be two passenger vehicles for each three trucks.

Page A-10. Table A-2-4. The commercial development portion appears to be mislabeled. The sixth column probably should be trucks rather than vehicles and the eighth column probably should not include (vans-trucks). Are these year 2000 data?

Pages A-12 to A-20. All these tables identify total airport trucks entering per day. This has been explained as a mislabel. The figures should have been total cargo trucks. The existing year data is not included. Additionally the 154 figure for total trucks for 1982 for the total airport is obviously wrong. (Page A-17).

Page A-40. Traffic data has been presented both with and without a Porter Street/Maverick Street entrance to Logan. Which was utilized in determining noise and air pollution impacts? Is there a commitment anywhere in the FEIR to close said entrance?

Page A-43. Table A-3-18. Has no existing data. Has truck figures at variance with other data cited (by 30 or so trucks). (see footnote #2) The mixed use columns with and without GA appear to be reversed.

Page B-3. Indicates 5 additional flights due to BIF development. Elsewhere 6 and 9 are indicated. The FEIR should be consistent.

Page 6-10. The existing noise levels were based on "summertime (August 1978) Massport noise monitoring site measurements and are for an average day (neither the noisiest nor the quietest day, but approximately in between)" This does not seem to be the worst case mentioned so often in the report as on Page B-12

Page B-22. Indicates an increase of 3 to 5 dB to account for pure tones. EPA documents suggest 5dB. On page B-22 the 5 dB figure is used. On page B-29 3 to 5 dB are used for the pure tone penalty. These are all in the Appendix. In the main text, Page 4-14 only the 3 dB figure is used as the pure tone penalty. Nowhere is there a discussion to justify the lower figure.

Page B-40. Table B.1-6. Why are there no takeoffs on 9?

Page B-41. No trucks are included in table B.1-7 for the North Apron.

Page B-43. Also no trucks.

Page B-44. Also no trucks.

Page B-45. Table B.1-10. Does not include existing conditions.

Page B-48. Table B.1-13. Where do these reductions occur?

Page B-51 Table B.1-16. Does not indicate to point of noise measurement.

Pages after B51 - Figs. B.1-1, B.1-2, B.1-3, and B.1-4 if based on the discussion on Page B-10 are not worst case conditions.

Page B-60. The first super script 3 should be 2 for footnote #2.

Page B-66. Why is there a drop in GA flights by the year 2000?

Page B-67. Why do the present 99 nighttime commuter operations drop to three by the year 2000?

Page B-68. What year does this table refer to?

Pages B-72 & 73. Truck numbers do not match those on page B-16.

Pages B-96, 98, 100. No tone correction is indicated.

Page C-11. 90% of CO=auto. However, as much as 60% of the auto traffic may be Logan related.

Page C-12. The NO_x - NO_2 adjustments do not appear valid. See also monitoring conditions on Page C-7.

Page C-13. Isn't the HC concentration related to ozone levels?

Page C-16. "if" found should be is found. 3.7 CO should be 3.7% CO.
Last 2 lines - do the "generally worse" air quality referred to mean more violations?

Page C-21. CO over existing conditions should be HC.

Page C-25 (after) figure C.1-34 - Are the construction particulates included?

Page C-29 & C-30. No build at #6 compared with existing is listed as +1.9 on the table and 0.9 in the text.

Page C-35, Line 5 - first particulates should be participates.

Page C-40, C-41, C-42 do not agree as to which runways were modeled.

Page C-42. Are the gas and oil quantities as used in 1970 or equivalents if all heating was from one source for the year? Are the proposed levels to be added to existing conditions?

Is the no build the old or new version?

Were these pollutants included in the earlier modeling?

Page C-54 - last line of 2nd paragraph does not make sense.

Page C-55. What is the "preferred" alternative?

Page C-58. The "old" DEIR, Revised Parking Demand, and preferred alternatives are not clear.

Page C-59. Next to last paragraph - should the "cut to 3-engine operation" be 2-engine operation?

Page C-66. Fourth line from the bottom - "along" should be alone.

Page C-67. What is the total HC reduction possible by all three strategies together?

Page C-74. 3rd paragraph - 2nd sentence does not make sense.

Pages C-79 through C-90. What are the 8 pollutants and the 12 aircraft classes?

Page C-101. What is the year of this data?

Page C-104. Under vehicle speeds - name peak should be same peak.
Also does the modal times consider cruising in parking lots for an open parking space?

Page C-105. Does this table refer to only cargo? or all trucks?

Page C-109 - Reception locations - what is missing in the 2nd line?

Page C-118. How did the current data compare with previous data?

Page C-120. Because no calibration was accomplished during the 30 days -- all measurements were adjusted on the basis of the instruments performance on the last day. This gives even more scepticism to the NO_x and NO_2 projections. See Page C-12 comments.

Page C-121 - Has the measurement program been completed yet?

Figure SDC5-3. The scale is not legible.

The above minor problems needing correction, amplification, acknowledgment or explanation can probably be addressed as errata.

DES:cg

INFORMATION REQUESTS

AIR QUALITY

1. NO_x

Similar questions concerning modeling procedures for NO_x have been raised by DEQE, the community air-quality consultant, and the MEPA staff. These questions relate to:

1. downward adjustment of the model by 120%, based on a single wintertime observation, to estimate maximum 1-hour NO_2 concentrations;
2. the relationship between NO_x and NO_2 .

As the EIR states, Jeffries Point is downwind of the airport (winds from NNE-SE) 31% of the time. During winter months winds from these directions are quite infrequent. Furthermore, the ratio of NO_2/NO_x is likely to be higher in summer than in winter.

Another measure used (on page C-12) to justify lowering of the model results is ERT's suggested NO_2/NO_x factor of .2. However, Dr. Spengler points out on page 8 of his comment that the measured proportion of NO_2/NO_x during ERT's summer 1979 monitoring, with wind from the airport, was 80% at Bayswater Street, which is a higher proportion than the ratios used to adjust the model.

Further alteration of modeling data is discussed on page C-120 and is noted in Dave Shepardson's comments.

Thus, the questions of whether the NO_x/NO_2 analysis represents the worst-case, including the uncertainties concerning the reliability of the projected concentrations raised on page 2 of Dr. Spengler's comments, should be responded to.

In addition, Dr. Spengler points out that the DEQE has applied the World Health Organization short-term NO_2 standard of .32mg/m³ as a 1-hour value not to be exceeded at several "hot spots" in Brookline and Newton by MATEP. Is the same standard applicable to East Boston? If not, why not; or if so, why hasn't it been used in the analysis in the EIR?

2. CO

In vehicle estimates on airport loop roads, an average speed of 30 mph was used. Looking at year 2000, what evidence supports this speed? If the average loop speed were 10 mph, the CO and HC emissions would approximately double.

Noise Buffer between Maverick Street Residences and Proposed Access Road

The EIR summary states that noise levels produced by construction trucks along the access route north of Maverick Street are somewhat dependent upon when the existing airport buildings between the proposed service road and Maverick Street will be removed. If the buildings are removed before or during construction, the 60 dB level is likely to be exceeded. To avoid this mitigation measures will be necessary. The report does not say who decides when the buildings are to be removed or upon what the decision will be based. If the decision rests with Massport, would it be advantageous from a noise point of view to leave the buildings in place during construction. Assuming the buildings do remain, how would their effectiveness in reducing noise compare with that of other mitigation measures proposed for the same area; and what would be the combined effect of leaving the buildings in place and including some of the following recommended measures:

1. construction of a permanent access road 500 feet north of Maverick street by 1985;
2. establishment of a temporary truck route approximating the location of the proposed relocated service road;
3. routing trucks along the existing road adjacent to Maverick Street, when truck numbers exceed 25 per day, along which Massport will construct a 15-foot high temporary barrier;
4. prohibiting deliveries between 10 pm and 7 am?

Discussion of the above measures raises some additional questions.

1. Why is construction of the permanent access road proposed for no later than 1985, rather than at the outset of the project so it could service all delivery trucks?
2. How often will truck numbers exceed 25 per day?
3. Why is a 15-foot wall, which would achieve a 3-7dB reduction, proposed when a 13dB reduction could be achieved with a 20-foot structure?

Freight Forwarders

Analyze the traffic impact of locating freight forwarders on BIF. What would be the difference in the number of trucks if forwarders were located off rather than on the airport? The comment from the East Boston Land Use Advisory Council indicates an interest in pursuing mutually acceptable zoning changes. What options are available for forwarders other than BIF?

Community Streets

The closing of airport entrances from Maverick/Porter Streets was discussed in the EIR but no conclusions were given. 13% of the traffic entering the airport, of which 16% is trucks, passes through this entrance, making this the second largest truck entry after North Apron. What would be the effects on community streets, in terms of numbers of cars and trucks, and alternate routes, of closing the Maverick/Porter St. entrance?

Third Harbor Crossing

Show on a plan alternative locations for a third harbor tunnel portal and provide figures for the square footage that would be required above ground for a tunnel outlet. The intent of this request is not to introduce tunnel design into the project but rather to address concerns that BIF development may preclude or restrict the possibility of a tunnel should it be needed in the future.

SU:cg

MITIGATION

The EIR discusses ways in which impacts can be mitigated and makes definite commitments to incorporate many of them into the plans in what appears to be a genuine effort to minimize negative impacts on adjacent communities. In addition to the firm commitments made in Chapter 5, several measures are promised throughout the text and appendices which should be added to the Chapter 5 list. These include energy conservation in building design, including such solar and microclimactic considerations as orientation of buildings to maximize solar potential, provision for keeping winter winds out and for allowing summer breezes in; measures aimed at reducing traffic; oil/water separators for aircraft apron areas; dust reduction during construction; and limitation of construction work to the hours of 7 am to 3:30 pm.

In some instances Massport has not gone as far as it could go toward committing to measures which will minimize impacts on the environment. The MEPA Act requires that Massport take all feasible measures to avoid or minimize damage to the environment. In other instances planning for implementation of mitigation measures needs to be carried further than has been described in the Report if the measures are to be effective. Such areas are discussed in greater detail below. The list of mitigation measures in Chapter 5 should be expanded to include the following measures.

1. Compliance with Clean Air Act and State Implementation Plan

It looks as though Massport is managing to get BIF development in under the wire with respect to emissions offsets, and that Massport will be a beneficiary of the delays in implementation of the SIP. This should not be permitted to occur, and the fact that Logan is a major source of CO, HC, NO, and TSP emissions should not be lost in the semantics of how it is currently designated. If, as the DEQE comment states, major sources can be required by EPA and DEQE to offset emissions from a new project by reducing emissions elsewhere, compliance will evidently have to be achieved or not. By the time the SIP is approved, BIF will no longer be a "new" project and will therefore not be required to comply.

There are at least two possible ways of avoiding this violation of the intent of the Clean Air Act. One is for Massport to work with EPA or DEQE to develop and agree on emissions control strategies before proceeding with BIF development. Another is for Massport to commit itself to do so once the SIP has been approved. Commitment to either approach, or to some combination of the two, should be included as a mitigation measure in the Final EIR.

2. Timing of Buffer Construction on BIF

The EIR anticipates that by 1983 the following percentages of cargo and GA facilities will be completed:

- at least 50% of the primary cargo building and apron
- 100% of GA facility
- 80 to 100% of the building and apron serving itinerant and smaller cargo operators.

The constructed facilities will be operational (though not at capacity), while construction of later phases continues. The EIR's discussion of a timetable for construction of a passive or active buffer along the west side of BIF is imprecise, and oral comments from Massport indicate that it is not likely to be constructed until 1987. Construction of the buffer, whether active, passive or a combination of the two, should be accelerated so it can begin sooner to serve its functions as visual and noise buffer during construction and before other phases become operational. Commitment should be made to provide the buffer first, not everything else first, followed by buffer construction as a final touch as indicated in the current timetable.

3. If the buffer on BIF is to be either totally or partially passive, the facade facing Jeffries Point should be of aesthetically pleasing design and should be attractively landscaped.

4. Hydrocarbon Emissions Reduction: Vapor Recovery

The EIR dismisses measures for control of fuel storage and handling, other than an BIF itself, on the basis that no single measure could achieve a significant reduction in odor impact and that controls are not currently state-mandated to achieve the ozone standard. However, significant reductions in HC emissions and possibly in frequency of odor, could be achieved if all measures described in the EIR were applied in combination. These include:

- A. control of emissions from existing fuel storage and handling facilities, which should result in a 35% reduction in total airport emissions and a 25% reduction in odor intensity;
- B. reductions expected to result from federal regulation of engine classes, reducing total airport emissions by another 10-20%;
- C. control of vapor emissions at fuel storage and handling facilities on BIF, predicted to reduce HC on BIF 45% and about 25% at Jeffries Point.

Vapor recovery efficiency is high, and control methods are cost effective. Since the HC problem is already severe at Logan, and since the proposed development plan predicts at 17% increase over existing levels, HC emissions should be reduced wherever feasible by installing vapor recovery systems at all fuel storage and handling locations.

5. FAR Part 36 Compliance Schedule

Aircraft noise is obviously a major source of distress to residents in several communities underlying flight paths. FAA noise regulations have established a schedule for aircraft to comply with given noise levels set forth in FAR Part 36 by certain dates (1895 for most planes, 1988 for small 2-engine jets) however, there has been a tendency for those dates to be pushed back. As an assurance to communities that noise reductions will progress as presently portrayed, Massport should require, as a mitigation measure, that aircraft using Logan must meet the FAR Part 36 current compliance schedule irrespective of whether the federal schedule changes or remains the same.

6. Dust Control During Construction

Planning and commitments to accomplish the needed 50% reduction to meet the standard for particulates during construction are not precise enough and have not been carried far enough. The measures to reduce dust during construction described in Chapter 5 are excellent in principle, but they leave some important decisions to be made on the spot and uncertainty as to how they will be implemented. It is not clear who will instruct and monitor the contractors or who will decide when conditions warrant application of mitigation measures. Massport should make this clear, and should follow the community's suggestion that mitigation measures (including the 15-acre construction area limitation) and monitoring procedures be specified in construction contracts.

Massport should make a commitment to ensure that TSP standards are met during construction and to install air-quality monitoring devices on-site.

7. Other Construction Mitigation Measures

- A. A "quiet" pile driver should be used, if feasible.
- B. Only equipment which meets current EPA standards for noise emissions should be used.
- C. Construction noise standards should be developed for this project and noise should be monitored.
- D. The EIR states that unless major phases of construction overlap, noise levels are expected to be lower than existing daytime noise levels. Ensuring that major phases do not overlap is a possible mitigation measure which was not mentioned but should be included. Although it may not be feasible to plan precise construction methods and schedules this far in advance, it should be possible to schedule major phases of the project to avoid overlap, if overlap produces a noticeable effect on noise levels.

- E. The EIR stated that construction work is to take place between the hours of 7 AM and 3:30 PM. Could this be put in the form of a commitment?

8. Noise Reduction

- A. The EIR states that N-S rather than E-W orientation of cargo buildings would achieve a 3 dB reduction. Rebecca Fleishman comments that a 3 dB increase is a clearly audible change. It is not clear why this mitigating measure has been rejected.
- B. Why is a 15-foot wall, which would achieve a 5-7 dB reduction, proposed along the access road adjacent to Maverick St., when a 13 dB reduction could be achieved with a 20-foot structure? Massport should make a commitment to timely construction of a 20-foot wall. The road should not be used to serve BIF-related traffic until the buffer is in place.

9. Traffic Mitigation

Measures to reduce CO at tunnel portals have not been adequately addressed. No mitigation measures were included for the tunnel because standards will not be exceeded in 1987. However, after 1993 CO is predicted to increase again, and the EIR shows an increase of 10.3% over existing conditions for the proposed development plan in 2000, despite reductions that will have been achieved by stricter federal standards for auto emissions. It also predicts near violations of the 1-hour standard in year 2000 at airport terminals, parking facilities and at the Hilton Hotel. The fact that federal regulation of auto and aircraft emissions is expected to reduce CO levels, bringing the airport into compliance, does not license Massport to increase the reduced levels. In addition to the obvious nuisance and delay factors which stem from traffic congestion, these traffic-related air quality problems make effective traffic reduction programs imperative.

Potential ways to minimize traffic and tunnel congestion, some of which were discussed in the EIR, include:

1. shuttle bus service connecting BIF to existing public transportation;
2. employee car and van pools;
3. reduction in number of employee parking spaces on BIF;
4. improved bus and limosine service;
5. other employee incentives (not specified);
6. operation of a ferryboat to BIF, connecting to public transportation at both ends.

Although the EIR states that Massport is committed to reducing traffic and the programs suggested are good in principle, no details are provided concerning responsibility for their planning, timing, implementation and monitoring. Planning of these measures should take place prior to completion of construction so that when BIF operations which generate additional traffic commence, measures to reduce traffic are ready for implementation at the outset. How will Massport ensure that future tenants adopt and participate in the

above programs? What mechanism will be used to monitor their effectiveness?

The response to these questions and a precise description of how these programs will be implemented should be submitted in the form of a definite commitment.

SU:cg

PRELIMINARY STAFF REPORT

TRAFFIC ASPECTS OF THE BIRD ISLAND FLATS FINAL EIR and APPENDICES

For the entire site, it is understood that development will be limited to 95 acres, with 65 acres for building area and 30 acres for apron area. In terms of land use, 75 acres will be for air cargo functions, whereas 20 acres will be for concentrated commercial development, which tends to generate larger amounts of traffic. The commercial site is expected for completion by 1985, with the cargo facilities gradually expanding in activity and generated traffic up to the year 2000.

The concept of having land activities near Jeffrey's Point which are not noisy is good, but problems occur in other areas if traffic impacts are taken into account. The office and light industry in particular suggest busy traffic conditions, with poor transit access; however, the hotel/Convention Center has beneficial impacts, inasmuch as there may be reductions in peak hour travel between the airport and downtown Boston. It is a shame that the hotel is at BIF rather than over the MBTA station as a hotel was suggested a few years ago. The I-station location makes more sense for transit access to downtown Boston and would permit improvements to the Airport I station.

EXISTING TRAFFIC : The overall traffic analysis is not presented in an orderly and methodical manner. Information sometimes appears almost random in presentation, and the results are an increased tendency to present inconsistent information. For example, existing traffic data (1979) varies from a total of 30,492 on page A-39 to 36,363 on page A-22 and also on figure A.3-1. The lower count is referred to as a "1979 count" and is used within the analysis, while the larger count is referred to as an "April 1979" count. The inconsistencies between the two counts are shown in the breakdown of entering volumes from the four main entry points to Logan Airport :

	(A) 1979 Count (p. A-40)	Count (B) April 1979	Difference A over B
ENTRY # 1	4,282	3645	+ 17.5%
ENTRY # 4 (tunnel)	16,546	21,339	- 22.5%
ENTRY # 5	5,755	8,554	-32.7%
ENTRY # 6	3,909	2,825	+ 38.4%
	<hr/> 30,492	<hr/> 36,363	- 16.1%

Such variation is extraordinary and requires explanation. Traffic counts may vary 5-10% from one weekday to the next, but such major fluctuations are most unexpected.

So the first thing which needs to be done is to establish what are reasonable existing traffic volumes. As best as I can determine from the data on pages A-20,21, there are 37,000 vehicles entering Logan overall (74,000 ADT), with about 60,000 on the main access road to Logan and about 7,000 ADT on each of the other two access roads.

In addition to traffic which is entering and leaving the perimeter of the Airport, consideration should be given to internally circulating traffic, which includes buses, taxis, hotel/rental car courtesy vans, etc. Based on Table D-2 of Appendix and Fig. A.3-1, I would estimate circulating traffic within the airport loop to be in the range of 2000 to 3000 ADT. One loop would be via the I-station and the other turnaround on the crossroad SB itself. This volume of traffic would have an effect on the internal congestion of the airport loop at the two crossroad signals.

Based on the April 1979 data (p. A-22) about 2000 ADT of medium and heavy duty trucks are part of the total 74,000 ADT vehicular traffic to Logan -- or about 3%.

Existing traffic to the airport comes significantly from the tunnels, in the range of 54.3% to 58.7% depending on which 1979 count is used.

The report does not contain peak hour turning movement counts at the crossroad intersections. Thus the effects of increased traffic growth cannot be evaluated, nor can the assertions of the Final EIR be checked for validity.

CARGO GROWTH : The 4% annual growth rate in cargo is properly reflected in the year 2000 projection of 473,000 tons. However, the 1980 (existing) figure should have been added to Tables S-1 and 1.3-2. In either Table, the figure for 1987 appears too low and may be a typo (should be 283,000?). The figure "536,000" on top of page S-3 should be 473,000, if mail is excluded.

~~XXXXXXXXXXXX~~ **TRIP GENERATION :** Due to variations in data, the generation rates used by IIE can be useful or they can be misleading. It is probably best to use them unless other empirical data is cited to show more realistic results.

The daily trip generation for the various land use components of the recommended plan is :

<u>Land Use</u>	<u>One-Way Entering Traffic</u>			
	DEIR	FEIR (A-7)	FEIR (2-13)	IIE
Air Cargo/Forwarders	- /1000sf	- /1000sf	4.6/1000sf	-
Offices	10.8/1000sf	7.15/1000sf	7.2/1000sf	6.15/
Hotel/Conference	3.1/room	3.1/room	4.8/1000sf	5.25/
Lt. Manufacturing	1.95/1000sf	2.99/1000sf	3.0/1000sf	2.73/

It would have been a useful check on the process to include the number of employees, especially since modern offices with the compact "open office" arrangement will tend to have more employees per 1000 s.f. The FEIR does note that a total of 3600 new employees are expected from BIF development.

IIE does not have a method of estimating air cargo trip generation, but the data in the FEIR appears reasonably detailed. If the proposed cargo development is 443,000 s.f. with 21,000 s.f. in support buildings (1-1), then the number of truck trips from the cargo operations with 450,000 s.f. of effective cargo operations is 2,160 entering truck trips/day. This conclusion checks with the assumption (p. A-7) that 3.3 trucks and 2.2 cars are entering Logan each day per 1000 tons of annual freight handled. It would appear, however, that proper weighted application of direct and indirect carrier truck trips on page A-3 and A-9 should be 3.4 per 1000 tons for trucks and 2.4 per 1000 tons for employee-auto

trips generated.

This conclusion that 2160 entering truck trips are produced from full-development (443,000 s.f.) cargo handling at BIF suggests that today with about 215,000 s.f. there should be about 1000 trucks a day entering. However, data on page A-8 shows about 150,000 annual entering truck trips, over about 320 annual days or about 475 truck trips a day. Furthermore, on page A-22, the April 1979 traffic count shows 3,343 trucks of all types entering Logan daily. Clearly, not all trucks are headed for cargo operations, but the situation becomes even more confused when the existing 3,343 truck figure is added to data on pages A-19 and A-20 :

TOTAL TRUCK TRIPS ENTERING LOGAN AIRPORT (all types)

YEAR	Proposed Develop.	Orig. DEIR No-Build	New FEIR No Build
1990	3,343	3,343	3,343
1992	1,148	4,440	2,019
1987	2,765	5,150	2,375
1993	4,018	5,502	2,375
2000	5,216	5,845	2,375

There does not appear to be any coherence or consistency in any of these growth projections. When the FEIR notes on page 4-89 that "The truck volumes associated with the proposed development plan are the lowest among Build alternatives," I simply cannot respond because the credibility of the truck volume figures is so weak. Problems with truck volumes were brought up by NEPA during the review of the Draft, and it should be the job of the FEIR to get this data right. Table A-2-1 is even more confusing. In many cases identical auto and truck traffic appears to be generated by BIF and the North Apron. Moreover, for many cargo alternatives, the auto generation is set at zero, which is inconsistent with data in the FEIR (including the 2.2 cars/1000 annual tons handled). This chart should be deep-sixed and new, correct data for both building area and generation rates included.

DEIR/FEIR information on trip generation (page 3 above) is not documented in the report. The actual one-way ^{entering} and two-way ADI traffic volumes for the full BIF development are estimated to be:

<u>Land Use</u>	<u>Entering FEIR Rate</u>	<u>FEIR Traffic</u>			<u>EOEA/IEE Traffic</u>	
		<u>Entering</u>	<u>ADI</u>		<u>Entering</u>	<u>ADI</u>
Air Cargo : 4.6/1000 473,000 sf		2110	4220	trucks	2175	4350
					33.4/1000 ^{trucks}	
		1407	2814	cars	1535	3070
					32.4/1000 ^{trucks}	
Office : 7.15/1000 500,000 sf.		3515	7030		3515	7030
Hotel/Conf. 3.1/rm. 350 rooms		1085	2170		1837	3675
						310.5/rm.
Lt. Manuf. 2.99/1000 300,000 sf.		897	1794		820	1640
						35.46/10
Total		5,557	11,114 ADI		9,992	19,764 ADI

The assembling of these numbers and the achieving of the total entering and ADI trips was a rather difficult exercise which the FEIR should have made very easy, because this is the type of summary data which an EIR is intended to present. I was not able to find in the FEIR a statement of what the significance was of these types of traffic volumes on Logan as a whole. At least three places in the text (including S-18) referred to a conclusion that vehicular traffic is expected to be between 150% to 250% of the present traffic volume, with or without BIF. Clearly, some outline of the assumptions of traffic growth without BIF should have been presented as part of the No-Build, while the impacts with BIF should have been presented as part of the Build alternatives. What should have been a simple presentation was not done in the FEIR.

It should be noted that in the Burlington Woods EIR (EOEA 03725) the trip generation rate used for the hotel was 15 ADI trips, so that 420 rooms generated 6,300 ADI. The Logan hotel plus conference center could generate more trips due to the conference center activity over and above the hotel rooms, so that the above estimates may be somewhat low for hotel/conf. center traffic.

If the 15 ADI trip generation figure were applied to BIF, then the total ADI would be increased to 21,339, or almost twice the ADI suggested by the fragmentary data in the FEIR.

If any Table in the FEIR were to do the job of summarizing the traffic data, then Table A.3-18 should have done the job. However, it appears that this table is exactly the same as the Table printed on page A-25 of the Draft, except for being retyped. Given all the differences in project size and generation rates plus the controversy over the truck figures and the definition of No-build, this table should have been substantially revamped. It does tell use that General Traffic entering (which appears to mean non-cargo-related traffic) is expected to be 57,370 vpd in the year 2000, for an ADI of 114,740. Total ADI ranges from 128,450 to 146,104 ADI, compared to April 1979 counts of about 74,000 ADI. So the traffic increases would be 73% to 97% "with or without" BIF. Where does the 50% to 150% figure come from?

If we compare the FEIR figure of 11,114 ADI as the BIF increment to the original total Logan ADI of 74,000 then the BIF represents a 15% increase in daily traffic. For the higher estimate of this analysis, 21,339 ADI, this traffic growth due to BIF is 29%. However, because of the desire to minimize (and even reduce) traffic at the two minor access points to Logan in East Boston, the traffic increases will necessarily be channeled through the main access roads from Logan, which have about 60,000 ADI. Thus these congested access roads would be expected to experience traffic growth of between 18.5% and 35.5%.

Such growth increments on a daily basis are quite significant for an area as congested as Logan Airport and its circulation loop and crossroad system. The office generation does nothing to improve the situation, and the office/conference center may attract new activity and traffic, rather than diverting existing activity which might be bound for downtown or the Route 123 belt.

EMPLOYMENT AND PARKING : It is noted on page 4-62 that 3600 new jobs will be created by BIF, compared with the existing total of 11,739 at Logan (p. 4-62) Thus the number of jobs increases by about 31%. I might have expected the number of new jobs to be higher based on the traffic analysis. It would be good to have a detailed breakdown of new job categories and numbers.

The shuttle bus will definitely be needed to help reduce the number of parking spaces for 3600 employees down to 1800. If we assume that the cargo workers are half daytime and half nighttime shifts, then there are about 3000 additional daytime jobs, with a need for 2400 parking spaces (if 80% of employees come by car, one person per car, A-42). If 70% of the employees come by car, with 1.5 people optimistically per car with ride sharing, then 1400 parking spaces are needed for employees, with 400 remaining for hotel guests and business visitors. How was the 1800 parking spaces estimated?

PEAK HOUR TRAFFIC ANALYSIS : The peak hour analysis in the report and particularly the Appendices is miniscule. There is no way that the results can be checked or reviewed.

First, we need to know how much peak hour traffic will be generated. On page 2-32, the BIF in 1985 is expected to generate 400 cars at the crossover intersection in the peak hour. However, if we assume that in 1985 the cargo handling at BIF will be at 25% of maximum capacity and that a 5% peak hour factor is applicable for cargo traffic, a 12% factor for office (10% out, 2% in for PM peak), a 7.5% factor for hotel/conf. (4.4% out, 3.1% in) and 10% for light industry (7% out, 3% in for PM street peak), then the peak traffic is :

		YEAR 2000			
Cargo	473,000	7420 ADT	135 In	135 out	370 tot
Office	500,000 sf.	7030 ADT	140 In	703 out	843 tot
Hotel/Conf	350 rooms	5250 ADT	160 in	230 out	390 tot
Lt. Manuf.	300,000	1640 ADT	50 In	115 out	165 tot
TOTAL		21,339 ADT	535 In	1235 out	1,770 tot

and for 1985 :

TOTAL : 15,775

395 In

1095 Out

Total Peak Hour : 1490

Note that the net change, the difference of ins and outs, is 700/hour. Another measure is to use the rule of thumb for commercial parking lots that about half the capacity is vacated in the peak hour. For the 1800-car parking area at BlF, this amounts to a 900-car net change. Taking into account the deletion of 300-parking spaces elsewhere at Logan, for a net of 1500 spaces, then the peak hour net change would be 750, which is close to the figure above.

However, both the figure of 750 and the total peak hour traffic volume of 1490 differ from the 400-cars in the peak hour referred to on page 2-32. This major discrepancy should be resolved.

The FEIR lacks turning movement diagrams, so that the traffic levels of service at the crossover intersections on the Airport Loop could not be checked. The FEIR begins by discussing practical capacity of the intersections in terms of LOS "C", which is more than optimum. Since tunnel congestion and blockages are classic LOS F conditions and LOS E and F occurs with considerable frequency today, the focus on LOS C is strange indeed. It would be best to discuss capacity as most laymen understand it -- maximum LOS E capacity or number of cars that can be gotten through the intersection. (pp. 2-29 to 2-30) the FEIR mentions forecasts of 200 car hour increases in non-BIF traffic and that traffic increases of 1-2 years would drop the LOS an additional step (2-31). Thus, periods which are now LOS C would be D, those now LOS D would be E, and one assumes that LOS E periods would be subject to longer queues and delays.

The FEIR states that development of Bird Island Flats would accelerate traffic congestion by "one year at the most" (2-32) yet the FEIR estimates BlF traffic growth by 1985 to be 400 cars/hour or two years of equivalent traffic growth. The 1985 data calculated at the top of this page show a traffic growth in 1985 of 1490 vehicles per peak hour, which by the own measures of the FEIR are equivalent to 7.5 years of growth of "normal traffic". Clearly, the FEIR tends to understate the traffic impacts.

Tunnel impacts are not discussed in any quantitative ways. On page 4-48 is the observation that tunnel impacts "are primarily the result of commercial development" and that traffic differences between Build alternatives without commercial development and No Builds is not significant. On page 4-89 is the most definitive tunnel impact statement in the report: "Additional traffic resulting from commercial development at BIF, however, might aggravate congestion at the tunnels." There is a discussion of air pollution impacts on page 4-50 which seems to imply that because things are terrible now they can't get any worse in the peak hour, but might extend the length of the peak period. I did not spend much time reviewing either air pollution or noise calculations because each is based fundamentally on traffic data, and for obvious reasons stated above I have many questions about the traffic analysis.

With turning movement counts at the crossover intersections, it would be possible to estimate the impacts of new traffic, as well as signal retiming or other traffic engineering changes.

RE: TRAFFIC ANALYSIS

MEPA STAFF REPORT

REVIEW OF TRAFFIC ASPECTS OF BIRD ISLAND FLATS

INTRODUCTION

The concept of having land uses near Jeffrey's Point which are not noisy is good, and thus constitutes a "mitigating action" in terms of aircraft noise. However, problems occur with the heavy peak hour traffic generation from the office and manufacturing activities, and these must be appraised as well. Transit access is not very good to the site, and running the existing large buses all the way down and back to BIF may severely hamper transit service to the rest of the airport. A separate bus loop to BIF could entail more confusion at the Airport NBFA station and longer waits for the bus itself. The Hotel/convention center would appear to be reasonable in traffic terms in that it could rely on the Hotel courtesy vans already in circulation and could reduce some of the vehicular congestion at the tunnel.

EXISTING COUNTS : DAILY TRAFFIC

Existing traffic counts designated as "1979" on page A-40 and April 1979 on page A-22 and on Figure A.3-1 differ by unacceptable amounts. Using the April 1979 counts as a base, the two counts differ by a total of 16% and the various entry points vary by +17.5%, -22.5%, -32.7% and + 38.4%. Such variations are extraordinary and cannot be explained by consultant "correction" or fine-tuning of the numbers. The count data should be reviewed, checked and a single "existing traffic" volume listing presented for a reasonably busy day at the airport.

The amount of circulating traffic on a daily basis should also be included, to account for transit, and hotel/rental car courtesy vans.

DAILY TRAFFIC GENERATED BY BIRD ISLAND FLATS DEVELOPMENT

A systematic listing should be provided for each type of land use at BIF, with corrected data for land use and generation rates. Where generation rates differ from the commonly accepted norm, an explanation should be given.

Land Use	Amount	Generation Rate	B.I.F. Vehicles Daily	
			Entering	ADT
Air Cargo	473,000 s.f. in yr. 2000	2.58/1000 sf	1221	Trucks 2442
		entering 1.72/1000 sf	814	Autos 1628
Office	500,000 s.f.	7.15/1000 sf	3575	Veh. 7150
Hotel/Conf	350 rooms	3.1/room	1085	Veh. 2170
Light Manuf.	300,000 sf	2.99/1000 sf	897	Veh. 1794
			<u>7,592</u>	Vehicles 15,184

This 15,184 ADT represents a 20% increase over existing Logan ADTs overall of 74,000. If the goal is to minimize any traffic increases on the two minor accesses to the airport, then this 15,184 ADT increase should be channeled through the main access roads, which represents a 25% increase over the 60,000 ADT here today.

Such growth increments on a daily basis are quite significant for an area as congested as Logan Airport and its circulation loop and crossroad system. The office generation does nothing to improve the situation. The above data is based on information provided by Massport in the Final EIR. The office and manufacturing generation rates appear OK, and the air cargo rates appear to have been studied quite closely at the Airport, although given the problems with numbers so far, another check (possibly a comparison with air cargo studies at other airports) might be a good idea. The hotel generation rates may appear low, but could be checked by counts on the existing Logan Hilton hotel. Some explanation should have been provided for the 3.1 trips/room figure used in the Final EIR.

PEAK HOUR TRAFFIC ANALYSIS

An orderly development of peak hour BIF traffic volumes is needed. Working from the overall BIF daily volumes above, and from reasonable peak hour vs. ADT percentages, we can estimate the peak hour volumes of vehicles in and out of BIF.

Year 2000				YEAR 2000		
Land Use	ADT	Peak Hour		Peak Hour	Vehicles for BIF	
		% ADT IN	% ADT Out	IN	OUT	TOTAL
Cargo	4070	2.5%	2.5%	102	102	204
Office	7150	2.0%	11.0%	143	787	930
Hotel/Conf.	2170	3.1%	4.4%	67	95	162
Light Manuf.	1794	3.0%	7.0%	54	126	180
Year 2000 : BIF		TOTALS		366	1110	1476

For the year 1985, with only 25% of the cargo activity of the final development, the cargo trips would be 75% less (77 each way) so that

Year 1985 : BIF	TOTALS	289 In	1033 Out	1322
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These figures are in rather stark contrast with the analysis on page 2-32 of the Final EIR which states that BIF will generate 400 new vehicles at the crossover intersection in the 1985 peak hour.

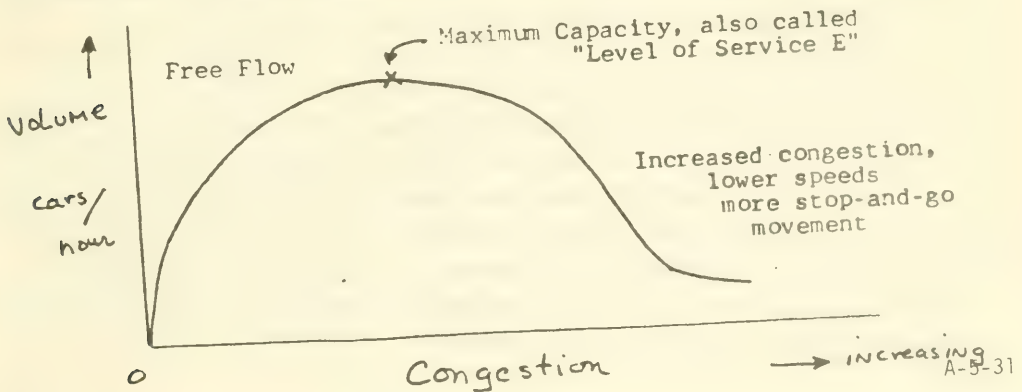
Note that as a check, the difference of the peak hour Ins and Outs from BIF Parking is 1110 - 366 or 744 for the year 2000. A rough check can be made assuming that the 1800-car parking lot at BIF functions similarly to an office parking complex, such that about half the cars have vacated during the peak hour, or 900 cars. Because of the hotel and cargo, we would expect the volume to be slightly less, so that the 744 figure looks fairly good.

The FEIR lacks turning movement diagrams, although I understand that Massport has this information. The next step should be to assign peak hour trips to the highway network within and adjacent to the airport and add these peak hour volumes to the turning movements, thereby setting the stage for capacity calculations. Focus should be on the crossover intersections and inner airport circulation first, and then on the external problems, of which the most significant is tunnel congestion.

TUNNEL IMPACTS

The tunnel impacts for traffic are not discussed in the FEIR in any quantitative way. The existing traffic to the airport comes significantly from the tunnels, in the range of 54-59% based on daily traffic counts in the FEIR. Recent data from Massport dated January 22, 1981, suggests that based on CIPS data the tunnels would appear to have extra capacity, based on the fact that traffic volumes have diminished since the early 1970s. The argument makes no reference to any perceived decline in congestion levels, and therein lies the key to what is happening. Traffic on the Central Artery has continued to grow, so that there are long-term periods, particularly in the afternoon when the Artery is backed up in both directions (in the Dewey Square Tunnel) and Northbound at the Tobin Bridge/I-93 split. Sometimes traffic flow in either direction of the harbor tunnels is difficult due not so much to congestion on the tunnel approaches, as on the departures (the Central Artery ramps & Government Center, for inbound traffic from East Boston to downtown, and the toll booths and airport road system for outbound traffic from downtown to East Boston).

Therefore, the fact that the tunnels may actually be carrying less traffic in the peak hour does not mean that there is residual capacity in the system to permit for traffic growth. Similarly, traffic which is heavily congested and crawling at a snail's pace will show reduced number of vehicles per hour, but does not mean that we can now add new "vehicles per hour" to bring the system back up to "capacity". The volume vs. capacity relationship for traffic is a classic non-linear situation, as shown below:



Therefore, the interpretation of the CTPS data that implies that there has been some extra tunnel capacity opening up is erroneous. It may be reasonable to assume that additional "real" capacity in the tunnel could be improved by Central Artery ramp changes, but it must be remembered that the Central Artery congests severely for extended PM peaks from Haymarket through the Mass Avenue interchange southbound and from Mass Ave. to Charlestown on the Northbound Artery. Some improvements could be made at the tollbooths and on the airport roads, but such changes for the PM peak would be in the opposite direction to the main BIF traffic, which is leaving the airport area.

The Department of Public Works has responded during the EIR review process and has raised the issue of the location of a possible Third Harbor Tunnel portal at Bird Island Flats. It is probably time that this issue be raised in a functional sense as well, in view of the allegations that a Third Harbor Tunnel is necessary to provide traffic relief and capacity for both the downtown Artery and the existing tunnels. A 25-30% increase in ADT traffic from the airport and a possibly higher impact in the peak hour (as appears projected for BIF) makes the Third Harbor tunnel issue more relevant to the Airport development issue. It may be time to ask whether the existing roadway system with all appropriate modifications will be able to withstand 25-30% ADT increases and if not how much benefit might accrue functionally from a Third Harbor tunnel. Depending upon the type of design and connection, it is conceivable that a Third Harbor Tunnel could have the following impacts on traffic flow :

- (a). Make things better (at least providing for more vehicles moved at the same levels of service/congestion as today)
- (b). Make no difference : existing congestion chokepoints would remain and would still govern the overall traffic flow
- (c). Make things worse -- if a tunnel design caused direct congestion onto the airport loop road and prevented airport circulation.

It is likely that the proposed improvements to the Route 93/Tobin Bridge (Route 1) interchange in Charlestown will provide some improved PM peak outbound capacity, but it will primarily help the Leverett Circle direction because the existing congestion on the Northbound Artery from Haymarket to the Storrow offramps is bad enough to qualify this

area as the new Northbound Artery "bottleneck." Because the Mass. Ave. ramps still constitute the southbound choke point, a new Harbor crossing to the South Station area would appear to result in improved access only to the West via the Turnpike. The ramps from either direction to the Artery could back up into the new tunnel and reduce the access to the Turnpike.

If the Third Harbor Tunnel project is extended down to include the Mass. Ave. interchange at the Southeast Expressway, then consideration must be given to the fact that the Southeast Expressway has other bottlenecks -- a lesser one at Columbia, a major one at Neponset, etc. Neither the Central Artery nor the Southeast Expressway is a facility which should be the logical candidate for increased traffic volumes. Thus BIF plus a Third Harbor Tunnel would appear to imply good access to the Turnpike but increased congestion on the Central Artery and Southeast Expressway. Without a Third Harbor Tunnel, Bird Island Flats would mean increased congestion at the existing tunnels and along the circulation loop at the airport. In this context, selection of Bird Island Flats development should consider traffic impacts very closely, and it would appear that the office and manufacturing land uses are not very desirable in traffic terms. The hotel seems to offer the best combination of quiet buffer land use without large traffic increases. The harborside location is also good for a hotel.

Unfortunately, Massport had to drop the ferry option from consideration in the Final EIR because of time considerations. I would urge that this option be continued as one of the few concepts which would appear to have positive transportation values that might be implemented in the short run. One option could be a ferry route from South Station to the Airport, with airport distribution via at least a Pedestrian connection to Eastern or a moving sidewalk/horizontal escalator connection to Eastern. With the planned Transportation Center at South Station (Red Line, Southerly commuter rail, commuter bus plus MBTA bus routes) transit options to both the airport and to Bird Island Flats could be improved. Another Ferry route could be from Rowe's wharf to BIF. An important advantage of the ferry is that for the first time since December 31, 1952 there would be pedestrian and bicycle service across the harbor.

Staff Report : BIRD ISLAND FLATS

: TRAFFIC IMPLICATIONS

prepared by Stephen Kaiser
Principal Civil Engineer
MEPA Unit, Office of Environmental Affairs
February 20, 1981

The Traffic Analysis Report, dated February 13, 1981 and submitted by Massport adequately responds to the requirements for factual presentation of traffic impacts from full development of Bird Island Flats, as currently proposed. These requirements were specified to Massport in writing and were further emphasized and clarified in subsequent staff meetings.

- (1). TRAFFIC COUNTS Using available data, existing daily traffic and PM peak hour traffic volumes have been presented in a unified manner. There remains a discrepancy of 4000 ADT between total inbound and total outbound movements to the airport, and there are also some peculiarities in the peak hour turning movement counts. However, the data is handled consistently between build and no-build.
Ideally, there should also have been a description of the extent and frequency of peak hour congestion (queuing) on the tunnel approaches and the airport access roads.
- (2). ALLOWANCE FOR OTHER TRAFFIC GROWTH : to 1987.
The Traffic Analysis Report allows for a 20% growth of ADT and 13% growth in peak hour traffic. In daily traffic terms, this means airport traffic goes from 75,000 ADT to 90,000 ADT. Included in this growth is BIF cargo-related traffic, which appears to be in the range of 4,000 to 5,000 ADT for full development by the year 2000. If we assume that by 1987 half of the cargo development has occurred, then BIF cargo activities in 1987 would be of the order of 1500 car and truck trips.
- (3). Joint Use TRAFFIC VOLUMES GENERATED
The concept of joint use is sound in terms of providing a buffer between the Jeffries Point Community and the aircraft operations at the airport. Unfortunately, the traffic consequences of the joint use development were not adequately taken into account in the planning and evaluation of the Bird Island Flats plan. The joint use element would generate about 9500 new daily trips, which is about a 13% increase over existing volumes. The site location causes many turning movements at the cross road and is not amenable to good transit access.

The traffic generation rates used in the February 1981 report are reasonable and show that in the peak PM hour, there will be 315 new vehicle trips to BIF for the mixed use and 1045 new trips out. This result is in contrast to the statement on page 2-32 of the Final EIR that BIF is expected to generate 400 cars at the crossover intersection in the peak hour. The new data indicates that 1360 vehicles in the peak hour would be traveling to or from the mixed use and that with mitigation (none of these vehicles traveling through Jeffries Point) all of these 1360 would be traveling through the cross road intersections. In my "Preliminary Staff Report" of January 4, 1981 I estimated that in the peak hour the mixed use would generate about 1400 vehicles in or out. Thus, the new Massport data appears quite reasonable and the EIR data should stand corrected.

(4). CAPACITY CALCULATIONS

Given the traffic counts and projected volumes of the February Traffic Report, my own calculations check with the volume-to-capacity ratios submitted by Massport, to within 1% to 3%. Thus there is no significant disagreement with the V/C figures as presented.

The tunnel congestion has properly been related to the constriction of the Central Artery, particularly the Northbound merge and weave at Haymarket. I would also note that the bottleneck condition is best described as the combination of the Haymarket merge-weave and the three-lane squeeze just prior to the Storrow Drive off-ramp. Prospects for changes to the Central Artery appear to be very limited, so that this bottleneck is likely to be an unavoidable fact for several decades into the future. The reconstruction of the Central Artery/I-93 ramps in Charlestown or the construction of a future Leverett Circle connector would not affect this Haymarket bottleneck.

Congestion on the Southbound Artery on-ramp from Haymarket is also evident today, yet this condition was not evaluated in the February 1981 report because of the predominating effect of the northbound congestion.

What does it mean for the Central Artery to be over-capacity by 23% in 1987? Basically, this means that 460 cars an hour cannot make it through and instead :

- (a). they would find another route.
- (b). they would make the trip at another time
- (c). they would not make the trip at all
- (d). BIF-related trips are made, while others are forced to change their trip-making.

A similar kind of shift would occur on the airport access roads, where

the 1987 Build Cross Road/Exit roadway would be 39% over-capacity according to Massport calculations. Within the airport, there will be "give and take" between various types of traffic until equilibrium is reached, and the likely "givers" will be other airport users, particularly passengers and shippers who can more flexibly alter their travel plans. Office workers on a strict time schedule or even on flexitime will tend to sweat out the traffic moreso than travelers, who have additional alternatives of bus or train.

Therefore, the likely consequences of major new traffic congestion at the Airport would be :

- (a). Extended length of time when congestion occurs, with longer traffic backups, extended back into the airport and affecting the cross road operations.
- (b). Some traffic, especially airport personnel and shippers, will be inclined to use local streets to get to McClellan Highway, the tunnels or Chelsea.
- (c). There may be fewer airline passengers during peak hours, with more bus and train riders. Thus there will be fewer peak hour flights but more flights scheduled on either side of the traffic peak (midday, early evening). Less profitable airline operations may result in a slowing of trends towards noise-control retrofitting of noisy, older aircraft.
- (d). Aircraft Noise implications : slightly fewer total aircraft operations, with more in the early evening, but some planes may be noisier due to less retrofitting.

* * * * *

(5). MITIGATING ACTIONS TO BRING DEVELOPMENT INTO BALANCE WITH TRANSPORTATION CAPACITY

Clearly, massive traffic congestion at Logan airport is in no one's interests, even for a short period of time. Alternative actions to reduce congestion appear to fall into three categories :

- (1). Build new capacity into the transportation system
- (2). Operate new facilities in a manner which generates less peak traffic
- (3). Modify, hold back, reduce the scale or eliminate certain high-traffic generating land uses at Logan, hence reducing the traffic generated in peak periods.

I would assess these options as follows :

- (1). NEW TRANSPORTATION CAPACITY : A major traffic problem at Logan could increase the perceived need for a Third Harbor Tunnel between East Boston and the Fort Point Channel. However, such a tunnel would be connecting into major existing congestion on the Central Artery/Southeast Expressway, both northbound and

southbound. A smooth flowing connection would be possible only to the Turnpike going westbound, and if the ramp connections to the Artery backed up, this congestion could extend back into the new tunnel and effectively block off access to the turnpike. Therefore, a Third Harbor Tunnel would have only a very limited traffic capacity value, if any, in terms of relieving congestion in East Boston and at Logan Airport.

As noted above, improvements to northerly sections of the Central Artery would not provide any significant added capacity because of the Haymarket bottleneck.

In conclusion, it does not appear that any plan proposed or under design will provide for any significant increase in ability to move vehicles across the harbor during peak PM traffic periods. The most cost-effective solution might be a cross-harbor ferry, which would have a small impact for a very low cost. However, the scale of BIF and airport operations would overwhelm the capabilities of all harbor ferry proposals made to date.

(2). REDUCED CONCENTRATION OF PEAK HOUR VEHICLE USE

Several proposals have been made by Massport to try to increase ridesharing and other methods of auto-trip reduction during peak periods. The reductions are comparatively small relative to the substantial traffic overloading of roads and intersections which result from the proposed growth and development.

(3). DIMINISHED SCALE OF MIXED-USE ACTIVITY

The Bird Island Flats proposal involves 500,000 s.f. of office space, 300,000 s.f. of light manufacturing and 350 room hotel/conference center.

(a). Hotel : Current proposals are for 350 rooms to generate about 2800 daily trips. However, fewer of these trips would occur during peak periods, and we might expect that a new airport hotel would be able to make maximum use of existing or added hotel courtesy buses, rather than taxis or other cars. Massport has made this logical argument, but has not conducted a traffic study of the existing Hilton airport hotel -- So that there would be base data available on trip generation.

(b). Manufacturing -- estimated to generate 230 peak hour trips; these trips would tend to displace other airport users. V/C reductions of 7% or so might be possible with deletion of manufacturing trips.

(c). Office -- office use at the airport appears particularly inappropriate because of the heavy peaking characteristics

and large amount of office space proposed. Peak hour trips of 815 additional vehicles are produced by this office development, which represents about 24% on V/C.

Additional Evaluation of Crossover Road Capacity

Massport has proposed that by the early to mid-1980s it would be necessary to provide a grade-separation of the exit/entrance roads and the crossover road. However, if the crossover road is made into an overpass, the traffic benefits would be very minimal, because very few vehicles wish to travel straight across the access roads. The Massport turning movement counts suggest that this through movement is almost zero, but at best a grade separation would reduce the V/C from 1.39 to 1.36. Thus, grade separation is no solution here. Adding a U-turn on the airport loop road would result in a more significant reduction : from 1.39 to 1.30. The congestion is caused by the predominance of many turning movements which grade-separation cannot solve.

(6). CONCLUSIONS AND RECOMMENDATIONS

There is no evidence that there is additional highway capacity which can be utilized for airport growth and new development. Thus, any non-airport activities which generate considerable amounts of traffic should be reduced in scale or eliminated to a level commensurate with transportation capacity.

Massport should develop a traffic-congestion reduction package composed of a mixture of less density of multi-use development, better transit service, ride sharing, "peak shaving" personnel schedules, good cross-harbor ferry service with better pedestrian connections between BIF and the airport terminals, a U-turn on the access roads, and any other ideas which might be positive and practical. Massport should also retain on-staff traffic engineering and analytic capability to deal effectively with these issues.

A spring 1981 traffic count should be made of Logan Airport roadways and access ramps, for daily traffic and peak hour movements. Checking should be done to insure consistent and professional results.

APPENDIX B - TRAFFIC ANALYSIS

Appendix B - 1 contains a technical background to traffic analysis and introduces the consultant reports. Appendices B - 2 to B - 6 contain the traffic engineering consultant reports. Appendices B - 7 to B - 9 are Massport staff background memos on the traffic assumptions used in the Revised FEIR.



APPENDIX B - 1 - Technical Background
to Traffic Analysis

APPENDIX B-1

TECHNICAL BACKGROUND TO TRAFFIC ANALYSIS

The traffic analysis discussed in Section 4.4 of this report is based largely on analyses conducted for Massport by two traffic and transportation planning consultants: (1) Vanasse/Hangen Associates, who revised the trip generation rates assumed for the FEIR Proposed Development Plan, developed rates for the RFEIR program elements, estimated traffic flows, and calculated volume to capacity relationships for critical roadway points, both with and without mitigating measures; and (2) Gordon Lewin, who recommended mitigating measures and calculated their effectiveness. The results of these consultants' contributions are described in detail in memoranda prepared by them, which follow. Memoranda prepared by Massport staff that provided data for the consultants' analyses are also reproduced. These consultant and staff memoranda include:

<u>Prepared By:</u>	<u>Date:</u>	<u>Subject:</u>
Vanasse/Hangen	2/13/1981	1979 Baseline, 1978 No-Build and 1978 Unmitigated FEIR Develop- ment Traffic Impacts
Vanasse/Hangen	2/23/81	Hourly Tunnel Flows

Vanasse/Hangen	(revised 4/29/81)	1987 FEIR Development Mitigated Traffic Impacts with Roadway Improvements
Vanasse/Hangen	4/28/81	1987 RFEIR Development Traffic Analysis
Gordon Lewin	3/11/81	Demand Estimate For Ferry Service at BIF
Gordon Lewin	3/12/81	Impact of MBTA Pass on Transit Use
Alan Eng	8/26/80	Lower Bound Aviation Forecasts
Ted Baldwin	3/26/80	Calculation of Adjusted Ground Traffic Baseline Growth Rate
Ted Baldwin	4/9/80	Calculation of Air Cargo - Related Car and Truck ADT's and P.M. Peak Hour Trips

This chapter summarizes the methodology and assumptions utilized in the analysis, particularly the basis on which the effects of mitigating measures were quantitatively factored into trip generation rates. For a more detailed understanding of the consultants' analyses, the reader should refer to the individual memoranda.

1 Traffic Analysis Methodology

The FEIR traffic analysis was based largely on ADT (Average Daily Traffic) levels. Because traffic is most seriously congested on- and off-airport during the late afternoon, the analysis was expanded to include the estimation of BIF-related traffic generated between 4:00 and 5:00 p.m., the hour which was identified as peak traffic hour (as shown in Hangen 2/23/81 memorandum). P.M. peak hour traffic flows and resulting roadway

performance measures were estimated by adding BIF-generated traffic (for both the FEIR and RFEIR development programs) to the forecast no-build or baseline traffic flows. 1987 was selected as the forecast year, because it is the year by which the cargo and mixed-use development are anticipated to be completed.

The steps taken in this expanded analysis included the following:

- ° Development of unmitigated and mitigated 1987 baseline traffic flows;
- ° Development of traffic mitigating measures and estimation of their effects;
- ° Review and revision of ADT trip generation rates, including the effects of mitigating measures, for the FEIR development program;
- ° Development of unmitigated and mitigated p.m. peak hour trip generation rates for the FEIR development program;
- ° Development of ADT and p.m. peak hour trip generation rates for the RFEIR development; and
- ° P.M. peak hour volume/capacity analysis for critical roadway links and intersections both on and off-airport.

2. Development of 1987 Baseline Traffic Flows

Massport conducted extensive traffic counts, and employee and passenger ground transportation surveys in April 1979 as part of its Logan Land Use Master Plan development. The availability of this large data base made it sensible to use 1979 as the base year for traffic assessment. For the purpose of the BIF clarifying analysis, non-BIF ADT traffic levels were assumed to grow by 20 percent between 1979 and 1987, and p.m. peak hour traffic levels by 13%.

The p.m. peak hour growth rate, which is most critical in evaluating the adequacy of roadway capacity, is based on an annual growth rate of 1.5 percent. This growth rate is less than the two percent annual growth rate used in forecasting 1987 ADT levels. Vanasse/Hangen based this lower rate on their knowledge of prevailing peak hour traffic growth rates in the Boston metropolitan area. This reduced rate is supported by historical data on the ratio of growth in ground traffic at Logan to the growth in enplanements. These data indicate that ground traffic (in ADT) has grown approximately only 60% as fast as enplanements. When the forecast 20% growth in enplanements is adjusted to take this difference into account, a 13% growth in ground traffic is indicated. P.M. peak hour traffic growth has been significantly lower yet, from 8% to 40% as fast as enplanements, suggesting the use of a growth factor even less than 13%. The reasons for the extremely low p.m. peak hour traffic growth are unclear. However, they may be due to traffic constraints and peak spreading. The higher ADT-based rate was

used to reflect growth in traffic demand rather than accommodated volume and to insure a conservative analysis. The basis of these growth factors are airline passenger forecasts prepared by the Massport Planning Department for use in development of the Logan Land Use Master Plan. The assumptions incorporated in the growth rates are discussed in greater detail in two appended memoranda: A. Eng. 8/26/80, Vanasse/Hangen 2/13/81. The relationship between enplanements and ground traffic is discussed in greater detail in the 3/26/81 T. Baldwin memorandum.

3. Mitigating Measures

Three major areas of traffic mitigation were quantitatively incorporated in the traffic analysis, including (1) measures to minimize automobile traffic generated by BIF development, (2) measures to reduce non-BIF-related automobile traffic generated at the airport, and (3) low-capital physical roadway improvements designed to increase on airport roadway capacity. Other mitigating measures were also considered, but were not quantitatively incorporated into the analysis. These other measures include a traffic monitoring program for on-and off-airport roadways affected by airport traffic, and improvements to off-airport roadway capacity.

3.1. Measures to Minimize Automobile Traffic Generated By BIF Development

The following reductions in BIF traffic generation rates were assumed in calculating revised ADT and p.m. peak hour traffic levels for the FEIR development program. The mitigating measures

on which these reduced traffic levels are based are briefly described. More detailed descriptions of the mitigating measures to which Massport is committed are included in Chapter 5. Where applicable, the same mitigating measures were applied to the development of traffic levels for the RFEIR program. Specific details regarding the development of the mitigated traffic associated with that program are described in the Vanasse/Hangen memorandum of 4/28/81.

° An increase in employee automobile occupancy

The BIF employee automobile occupancy rate assumed in the mitigated case was 1.4 persons per car. This is approximately 17% higher than the 1.2 occupants observed in the 1979 airport-wide employee survey. (This was the occupancy rate observed during the p.m. peak hour - the day-long average is somewhat less, approximately 1.1.). Massport believes that the assumed occupancy rate of 1.4 is a conservative estimate of the effects of its ridesharing program. The 1.4 rate is currently observed in peak hour Boston CBD occupancy studies. While the CBD offers strong disincentives to single-occupant auto commuting, particularly the cost of parking, few employers offer comprehensive ridesharing programs of the type planned by Massport. In addition, where aggressive ridesharing programs have been implemented, much higher occupancy rates are observed. The Boston John Hancock ridesharing program has resulted in an average of 2.3 occupants per automobile. The Transportation Research Board reported that the Tennessee Valley Authority

achieved a 2.3 occupant rate for its employees in Knoxville (TRB Special Report 184, 1979).

In order to promote high automobile occupancy rates among BIF employees, Massport is committed to implementing an aggressive ridesharing program. That program will include carpooling and vanpooling. To foster its success, Massport will arrange preferential parking locations and reduced rates for carpoolers and vanpoolers. Auto use will also be discouraged by limiting available employee parking on BIF. Any accommodation of excess demand will be in a remote parking location. Significantly higher fees will be charged for the use of parking spaces on BIF, except for carpools and vanpools. The net effect will be discouragement of single rider automobile use, through high parking rates and less convenient parking locations.

Massport's commitment to ridesharing and transit use is reflected in two programs recently implemented at the airport. First, effective July 1, 1981, the airport employee parking fee will be doubled (from \$15 to \$30/quarter). Massport has also alerted major airport employers that a further increase (to \$60 or \$75 per quarter) will be evaluated in 1982. Second, Massport has developed a comprehensive ridesharing program, called the "Logan Commuter Plan," for all airport employees. It includes carpooling, vanpooling and the MBTA Pass Program. Massport's support of the program includes 2 staff persons during a six-month implementation phase, plans for an on-going administrator, a professionally developed marketing program and subsidies to the vanpooling program over a six-month start-up period. The

Commuter Plan is being introduced three months prior to the effective date of the parking fee increase. As many airport employers partly or fully subsidize their employees' parking fees, they will also be encouraged to participate, particularly in the important areas of program marketing and internal coordination.

Massport is committed to achieving the highest possible rate of ridesharing and, based on the information cited above, believes that it will achieve higher rates than that assumed, which will reduce the traffic impacts further than indicated by the analysis.

o A ten percent increase in BIF employee transit use.

The employee transit mode share incorporated in the mitigated trip generation rates is based on an adjustment of the existing airport transit use rate. Currently, 6.6% of all airport employees use transit in their work trip. This percentage was increased to 7.3% (a 10% increase in the relative transit share) to reflect the influence of a mitigating measure requiring all BIF employers to subsidize one-half the cost of employee MBTA passes and airport shuttle bus passes. Massport instituted such a 50 percent MBTA and shuttle bus subsidy for all its employees several years ago and observed a 10% absolute mode shift from automobile use of transit. Much of this shift occurred among Massport's CBD employees where the effect may have been greater than among its airport employees, because of superior downtown transit service. Data are not available that reveal the airport

effect alone. Therefore, the mitigated trip generation rates assumed a much more conservative 10% relative increase in transit use rather than a 10% absolute increase (which would have brought transit's mode share to 17%) due to subsidies. Once again, the assumption used was very conservative; actual mitigation will most likely be significantly higher and the traffic impacts correspondingly lower.

Employee transit use will also be increased if Massport is successful in encouraging the development of private-carrier North Shore bus service. It is assumed that like existing airport employees, a high percentage of BIF employees will live on the North Shore. The North Shore currently is poorly served by public transportation; therefore, improved service will significantly affect transit use.

° 1.8% use of ferry by BIF employees

An additional 1.8% of all BIF employees were assumed to use the proposed ferry connection to the downtown Boston waterfront. The basis of this ridership is discussed in the appended Gordon Lewin memorandum of 3/11/81. As noted in that memorandum, this estimate of ferry use is almost certainly very conservative.

° "Flexitime" as a mitigation measure

A "flexitime" program, particularly for office workers, was recommended by some commentators on the FEIR as a method to minimize the peak hour traffic impacts of Bird Island Flats development. However, detailed analysis of this option indicates

that it would be less beneficial than might be anticipated. The attached Vanasse/Hangen memorandum of 2/23/81 provides information on the temporal distribution of office, hotel and light manufacturing trips. That information indicates that these activities all have P.M. traffic peaks at 4:00 to 5:00 p.m., an hour when traffic through the Sumner Tunnel and onto the Central Artery is typically congested. Most "flexitime" programs are designed to promote earlier quitting times; few employees are interested in a later starting and ending day. However, existing Sumner Tunnel traffic counts indicate that traffic through the tunnel is approximately 13% higher at 3:00 to 4:00 than at 4:00 to 5:00. Tunnel traffic between 5:00 and 6:00 is also slightly (approximately one percent) higher than between 4:00 and 5:00. Therefore, pending further analysis, a traditional flexitime program designed to encourage large shifts in travel time was not incorporated as a mitigating measure in the analysis.

3.2. Measures to Minimize Non-BIF-Related Airport Automobile Traffic

The following reductions in non-BIF-related automobile traffic was assumed at the airport in the evaluation of the FEIR and RFEIR development programs under mitigated traffic conditions.

° An increase in employee automobile occupancy to 1.4

This assumed increase in automobile occupancy, from 1.2 to 1.4 occupants per car is based on a conservative prediction of the effects of the Logan Commuter Plan, supported by the planned increases in employee parking fees (See Section 7.3.1).

° A ten percent increase in employee transit use

This increase in the relative percentage use of transit (from 6.6 to 7.3 percent) is based on several transit initiatives currently underway at Logan, including the investigation into private carrier North Shore bus service, promotion of the MBTA Pass Program through the Logan Commuter Plan, and the improved airport shuttle bus system, as discussed in Section 7.3.1.

Currently, Massport is the only airport employer that subsidizes MBTA passes or arranges for their purchase through payroll deduction. A major goal of the Commuter Plan is to encourage other airport employers to offer these benefits. As discussed in the Gordon Lewin memorandum of 3/12/81, MBTA data indicate that simply offering payroll deduction can yield a 1.2 percent absolute mode shift from automobile to transit, almost twice the .7 percent increase assumed. Once again, the assumed mitigative effect was highly conservative.

° A ten percent increase in air passenger transit use

This increase (from a 14.7 to a 16.2 percent absolute mode share) is based on increased transit use due to efforts currently underway to expand limousine and bus service at Logan,

the recent implementation of a high quality multiple loop airport shuttle bus system, and other measures described in Chapter 5.

In addition to these non-BIF related improvements, traffic congestion at the crossroad intersections will also be increased by the planned connection of the BIF access road to the inbound road via one of two Massport easements west of the existing Eastern Air Lines air freight building. This two-way roadway will have acceleration and deceleration lanes on and off the inbound roadway. Exiting traffic will reach the outbound road via the second U-turn described above. An important environmental benefit of this access road will be the elimination of direct access from BIF to Porter and Maverick Streets for outbound traffic. The cause of this benefit is discussed in Section 4.4. That section also discusses the fact that the roadway improvement program evaluated is representative of the types of improvement which might be undertaken; Massport is committed to immediately undertaking a detailed evaluation of the full range of low-capital roadway improvements and of traffic flows in the community to define the optimum solution to both on-airport roadway congestion and community traffic impacts.

3.3 Inclusion of Uses Designed to Minimize Traffic Impacts

While not specifically a "mitigating measure", in formulating the BIF development programs, special attention was paid to selection of land uses which would tend to generate reduced traffic impacts. A prime example of this intention discussed in the FEIR, was the concept of an airport conference hotel. The

concept behind an airport conference center is that it would be oriented to users who would fly into the airport from widespread locations to attend seminars, conferences, and meetings at the airport, and possibly would only leave the hotel in the evening for sightseeing or dinner. These trips would most likely occur after the 4:00 to 5:00 p.m. evening peak hour. Moreover, these trips would very likely be made on board the ferry or the MBTA. The convenient ferry and MBTA connections also would be attractive for any CBD business trips which hotel tenants might make. On-airport travel between terminals and the center would probably be made on multiple passenger courtesy vans or Massport shuttle buses.

MEPA comments questioned the accuracy of this assumption of reduced hotel trip generation. Several of the above arguments can be tested through observation of the traffic generating characteristics of the existing Airport Hilton. While it is not strictly a conference hotel and does not have ferry service, it does have an airport location and a shuttle-bus connection to the MBTA Blue Line. Therefore, as a partial test of the FEIR arguments, Massport conducted a traffic classification count at the Airport Hilton entrance on Thursday, March 5, 1981, from 6:00 a.m. to midnight. This count yielded unusually low ADT and p.m. peak hour trip generation rates.

An eighteen hour trip generation rate of 5.4 ADT/room was observed. While additional traffic occurs between midnight and 6:00 a.m., it undoubtedly is much lower than at other hours of the day. In addition, trips generated during those hours would

have no traffic impacts. The actual 24-hour trip generation rate is certainly less than the 6.6 ADT assumed in the FEIR. Moreover, the eighteen hour generation rate exclusive of hotel courtesy vans, which do not leave the airport, was only 4.8 ADT. This is the rate at which the Hilton would contribute to off-airport traffic congestion.

The p.m. peak hour traffic generation rates observed at the Hilton were also significantly lower than those which Vanasse/Hangen has developed from surveys at the Newton Marriott and the Cambridge Hyatt Regency and national rates from the Institute of Traffic Engineers trip generation manual, as shown below:

P.M. Peak Hour Hotel Trip Rate Comparison

<u>Case</u>	<u>Entering</u>	<u>Exiting</u>
Vanasse/Hangen Hyatt/Marriott	0.41	0.49
Hilton-All Vehicles	0.19	0.16

These data support the FEIR statements about reduced trip generation rates from an airport hotel. Even further reductions would be anticipated due to ferry operation and a conference orientation. The Hilton rates shown in the above table were used in the traffic calculations for the mitigated FEIR program. The unmitigated FEIR program assumed the Vanasse/Hangen rates developed from the Hyatt/Marriott surveys. The RFEIR calculations were based on data pertaining to pure conference center operation (See Vanasse/Hangen 4/28/81).

3.4 Non-Quantified Mitigating Measures

Massport is also committed to undertaking certain action to mitigate traffic impacts that were not quantitatively evaluated in this analysis.

The most important of these are a traffic monitoring program and measures to improve off-airport roadway congestion.

° Monitoring Program

Massport believes that the importance of airport-related traffic calls for unusual attention. Therefore, a traffic monitoring program will be implemented to monitor traffic volumes, roadway levels-of-service, the effectiveness of mitigating measures and roadway improvements, and to alert Massport to the need for further control measures. This program will monitor traffic conditions relating to all airport traffic, not just BIF-related flows, to identify the full scope of potential problems and solutions.

° Off-Airport Roadway Improvements

Massport will undertake a serious effort to identify solutions to off-airport roadway congestion, particularly in the tunnel/Central Artery complex. Potential solutions are described in Chapter 5.



APPENDIX B - 2



Vanasse/Hangen Associates, Inc. memo of
February 13, 1981 to N. Faramelli is found
in Appendix A - 3 - in this volume
(ppA-3-3 to A-3-39).



MEMORANDUM

✓
TO: Mr. Norman J. Faramelli
Director of Planning
MASSPORT

DATE: 23 February, 1981

REF.: VH #80-105A

FROM: Vanasse/Hangen Associates,
Inc.

RE.:

Per your request of 20 February, 1981, we are providing herewith 8-Hour Flows through the Sumner Tunnel. Flow data is provided by hour, between 12 Noon and 8 PM, for the following conditions:

- (1) Existing
- (2) 1987 No-Build
- (3) 1987 Mixed-Use and High-Intensity Cargo at BIF (FEIR)
- (4) 1987 High-Intensity Cargo Only at BIF

Development of Case 3 and 4 assumed the High Intensity Cargo Use at Bird Island Flats would generate 740 daily truck departures in 1987. This information was provided by your office on February 20, 1981.

We assumed temporal distribution of truck movement would follow current patterns and hourly flows are based upon data provided in Cambridge Systematics, Inc. Memo of 5 April, 1980, for Classification Station No. 3. This Station represented the only outbound flow count available with truck classification in the above memorandum.

Temporal distribution of Office and Hotel Space was developed on the basis of ITE data, actual counts conducted by our office and data derived from Pushkarev and Zupan. Light Manufacturing distribution by hour of day was not available from any of these sources. Only peak two-hour flows characteristics were obtainable from ITE; the remaining 6 hours are based upon our opinion and reflect a noon-time peak for lunch trips and relatively low, but even, distribution over remaining hours.

Per our earlier (13 February, 1981) memo, the amount of cars entering the Tunnel after leaving Logan was determined through analysis of Place of Residence of MASSPORT Employees for Office and Light Manufacturing trips. Hotel trips were assumed to be 50% generated on the Airport. Truck trips were assigned 60% to the Tunnel on the basis of Classification counts provided on Airport entry ramps from CSI April 5, 1980 memorandum.



Varasse / Hangen Engineering, Inc.
Consulting Engineers & Planners
184 High Street, Boston, Massachusetts 02110
617 / 482-1870

LOCATION DORFON

SHEET

CALCULATED BY RH

DATE

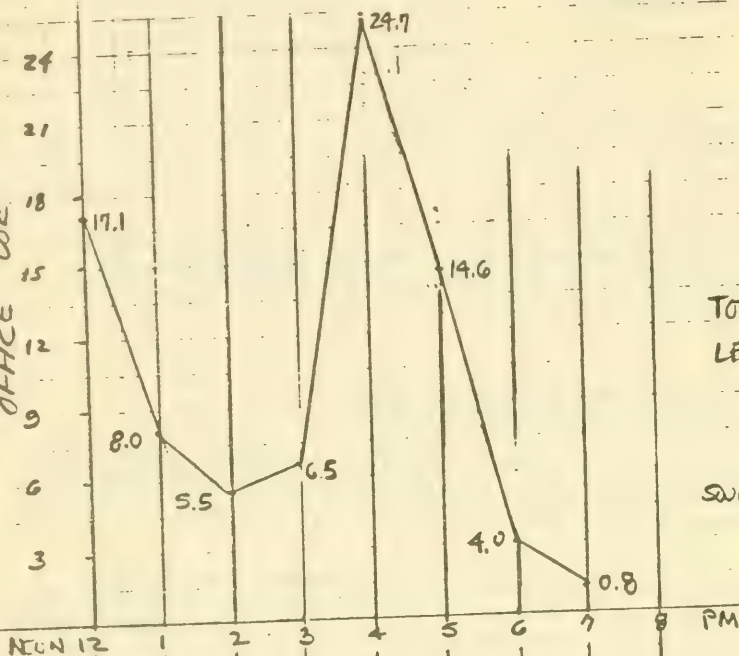
2/20/81

OFFICE & HOTEL

DATE

TITLE USE DISTRIBUTION 12 PM-8 PM

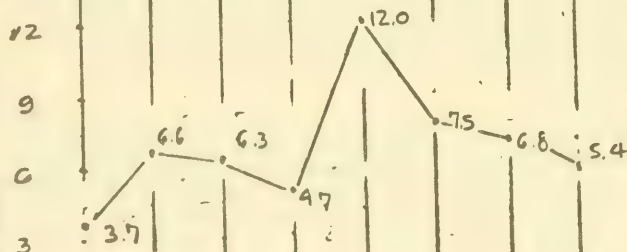
% - OUTBOUND OF
TOTAL DAILY OUTBOUND
OFFICE USE



TOTAL %
LEAVING 12-8 PM =
81.2 %

SOURCE: AUTHORITY & ZUMAN
URBAN SPACE FILE
PEDESTRIANS

% - OUTBOUND OF
TOTAL DAILY OUTBOUND
HOTEL USE



TOTAL %
LEAVING 12-8 PM
53.0 %

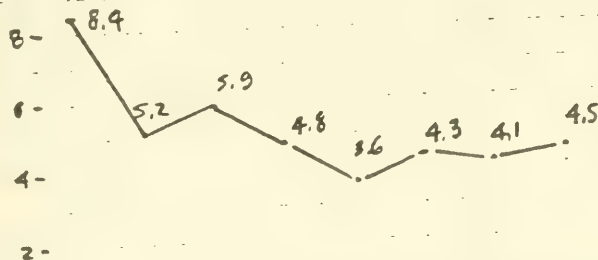
SOURCE: VH COUNTS @
MARLOTT HOTEL
3/1/80



ansanse / Hangen Engineering, Inc.
onsulting Engineers & Planners
34 High Street, Boston, Massachusetts 02110
71482-1870

LOCATION BOSTON SHEET 6 OF 6
CALCULATED BY RH DATE 2/26/81
TRUCKS & LT DATE:
TITLE MANUF USE DISTRIBUTION 12PM-8PM

% TRUCKS OUTBOUND OF
TOTAL DAILY OUTBOUND

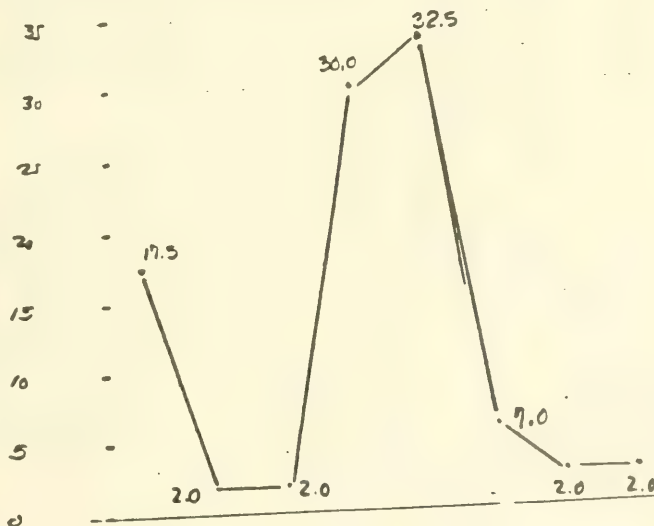


SOURCE: COUNTS
FROM MIXTURE AT
CLASSIFICATION STA. 3
1970

39.9% OF
ALL EXITING
TRUCKS OCCUR
FROM 12-8 PM

12 1 2 3 4 5 6 7 8 PM

% OUTBOUND OF TOTAL DAILY
OUTBOUND - MANUFACTURING USE



ASSUME
95% OF
ALL EXITING
TRIPS OCCUR IN
12-8 PM PERIOD

ESTIMATED -
PK HOUR FROM
ITE - TRIP GEN.
SPEC G INQUIRY PLANTS.



Vanasse / Hangen Engineering, Inc.
Consulting Engineers & Planners
184 High Street, Boston, Massachusetts 02110
617 / 482-1870

LOCATION

CALCULATED BY RM

DATE: 2/26/81

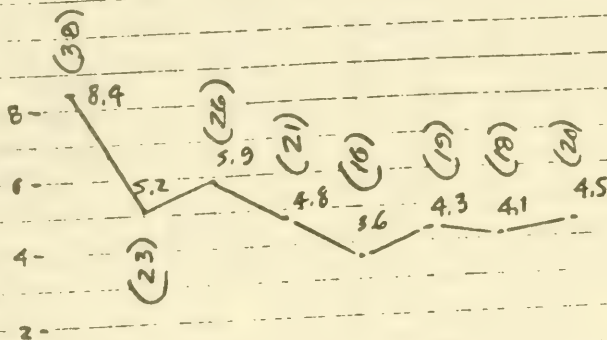
CHECKED BY:

DATE:

TITLE: TRUCKS & MANUE - OUTBOUND FLOW 12-8

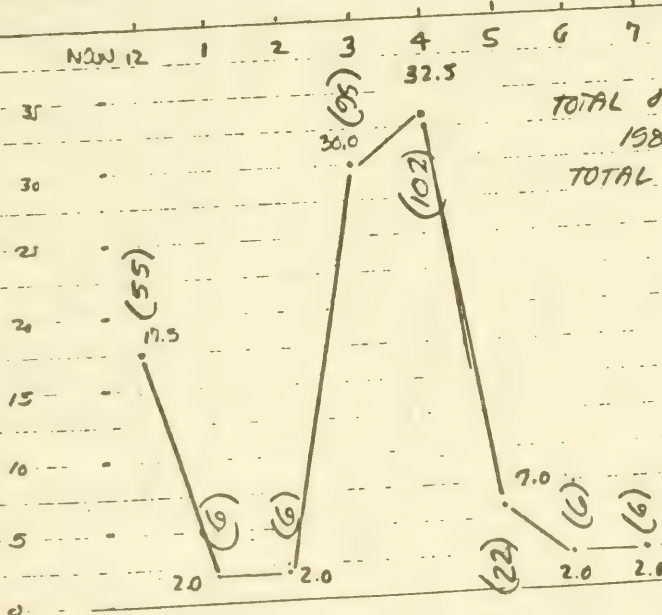
TOTAL OUTBOUND TRUCK TRIPS
1987 - ADOT = 740
TOTAL TO TUNNEL @ 60%
= 444

% TRUCKS OUTBOUND OF
TOTAL DAILY OUTBOUND



SOURCE: COUNTS
FROM MIXTURE AT
CLASSIFICATION STA. 3
1970
30.9% OF
ALL EXITING
TRUCKS OCCUR
FROM 12-8 PM

% OUTBOUND OF TOTAL DAILY
OUTBOUND - LIGHT MANUE USE.



TOTAL OUTBOUND MANUE TRIPS =
1987 - ADOT = 600
TOTAL TO TUNNEL @ 46% =
316

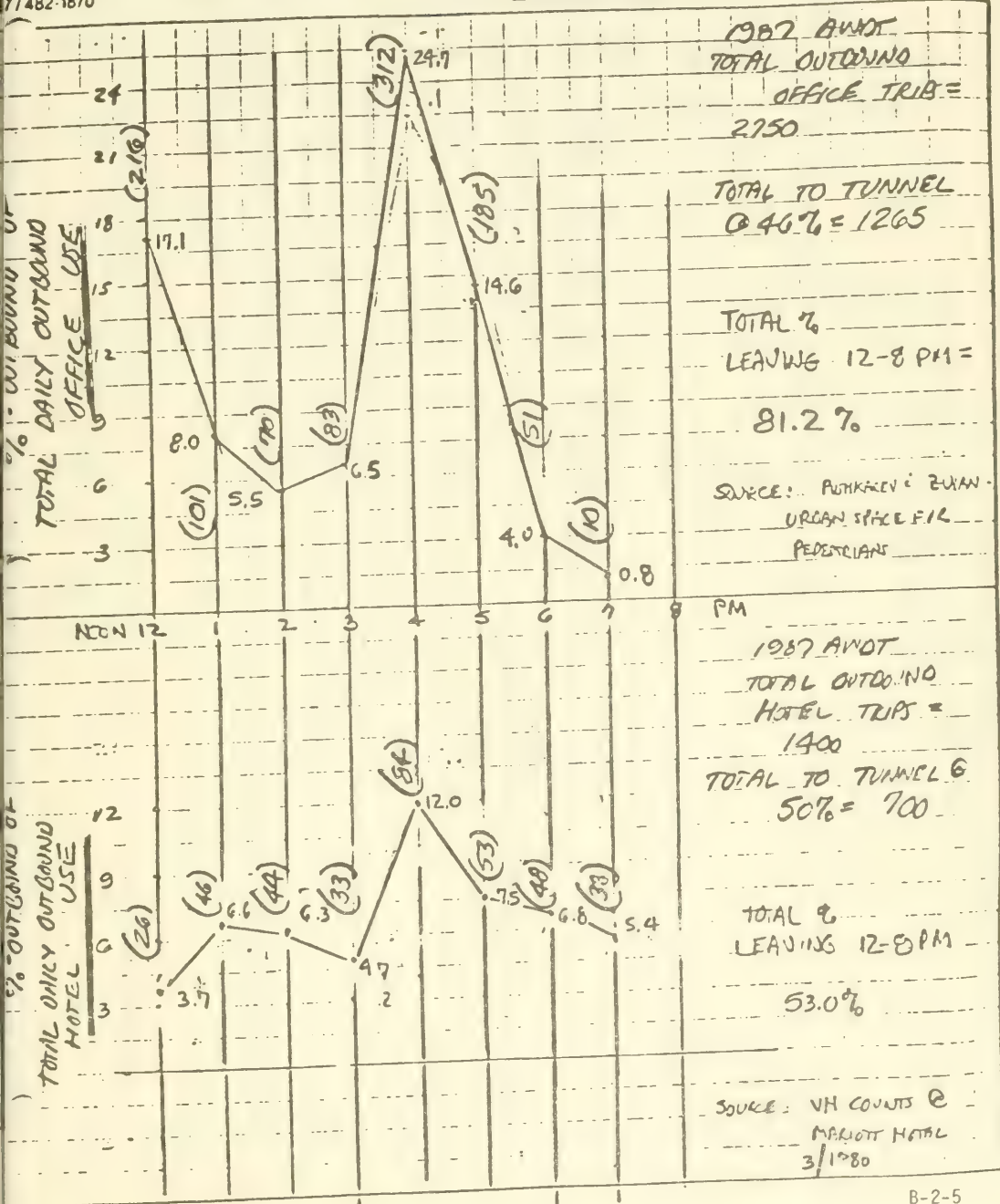
ASSUME
95% OF
ALL EXITING
TRIPS OCCUR IN
12-8 PM PERIOD

ESTIMATED
PK HOUR FROM
ITE = TRIP GEN.
SPEC @ INQUIRY PLANT.



Mass / Hangen Engineering, Inc.
Consulting Engineers & Planners
4 High Street, Boston, Massachusetts 02110
71482-1870

LOCATION BOSTON SHEET 4 OF 4
CALCULATED BY RH DATE: 2/20/81
CHECKED BY: OFFICE & HOTEL DATE: _____
TITLE: 1987 TRIP DISTRIBUTION - TEMPORAL





RH

DATE :

2/22/81

DATE :

TITLE:

OUTBOUND FLOWS THRU TUNNEL

[illegible]



Vanasse / Hangen Engineering, Inc.
Consulting Engineers & Planners
184 High Street, Boston, Massachusetts 02110
617 / 482-1870

LOCATION LOGAN SHEET 6 OF 6
CALCULATED BY RH DATE 2/23/84
CHECKED BY: DATE:

TITLE:

BIRD ISLAND FLATS
PROJECTED HOURLY FLOW VOLUMES
SUMMER TUNNEL

HOURLY OF DAY	EAST TUNNEL FLOW	1987 TUNNEL FLOW (NO BRID)	1987 WITH MIXED USE & HI INTENSITY CARGO	1987 WITH HI INTENSITY CARGO ONLY
12-1	2041	2298	2633	2336
1-2	1910	2150	2326	2173
2-3	2360	2657	2803	2683
3-4	2541	2861	3093	2882
4-5	2241	2525	3039	2541
5-6	2255	2540	2819	2559
6-7	2349	2643	2766	2661
7-8	2117	2382	2456	2402

$V = 1.126 \times \text{EXISTING FLOW}$

APPENDIX B - 3

MEMORANDUM



TO: Mr. Norman Faramelli
Director of Planning
Massport

DATE: April 29, 1981

REF: VHA #81-035

FROM: Vanasse/Hangen Associates

RE: Generic FEIR with
Mitigative Measures
and Roadway Improvements

This memorandum summarizes results of a capacity analysis with the generic FEIR at Bird Island Flats. The analysis assumes mitigative measures to increase transit usage for airport employees and air passengers and additional measures to increase car occupancy of airport employees. The effect of these measures as proposed by Massport will be to:

- increase airport employee car occupancy from current levels of 1.19 to 1.40;
- increase airport employee transit ridership from 6.6% of total trips to 7.3% of total; and
- Increase air passenger transit ridership from 14.7% of total trips to 16.2% of total.

In addition, Massport is planning extensive short-range roadway improvements to the existing at-grade signalized intersections on Logan Airport. Those improvements used in this evaluation include:

- 1) Elimination of U-turn traffic from Airport Exit Road to Entrance Road via left-turn onto the North-South Cross Road. This movement would be permitted on a new turning ramp constructed across the airfield east of the Cross Road. Accordingly, U-turn traffic will not pass through the signalized intersection.

- 2) Provision of an access road to Bird Island Flats, approximately 700 feet east of the existing North-South Cross Road. This configuration requires all BIF exiting traffic to leave the site via a U-turn through the Central Parking access road.
- 3) Construction of a "jug handle" at the Entrance Road/Cross Road intersection to accommodate left-turn vehicles from eastbound Entrance Road to northbound Cross Road.

Travel flows anticipated as a result of making changes to the roadway system during the 1987 PM peak hour are shown in Figure A.

The full build development scenario proposed on Bird Island Flats consists of a 350-room hotel, a 500,000 square foot general office building, a 300,000 square foot light manufacturing plant and a high intensity air cargo and freight forwarders facility. During the afternoon peak hour, the operation will generate 955 exiting vehicles and 296 entering vehicles as shown in the following table:

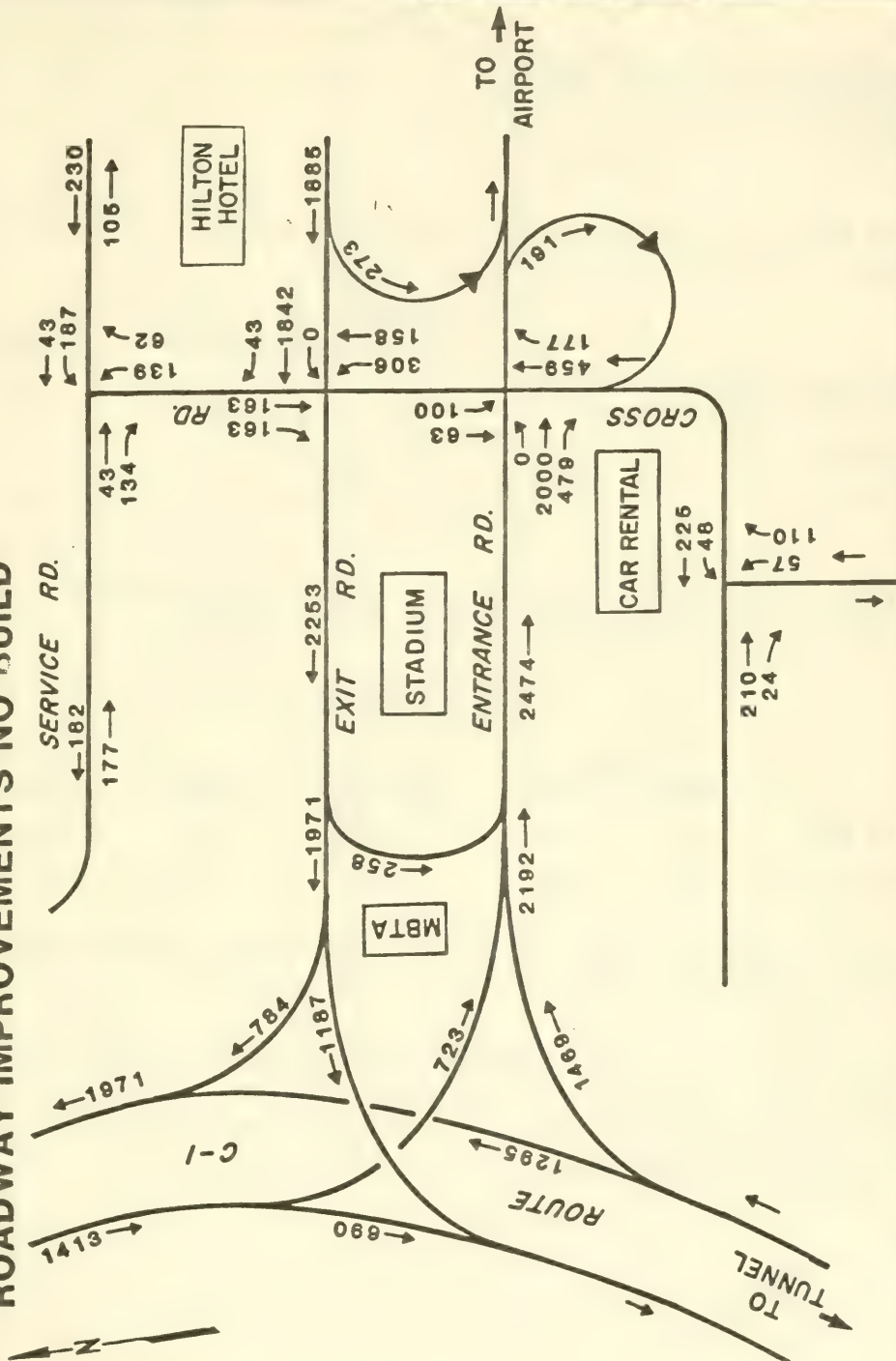
Land Use Category	1987 PM Peak Hour Vehicle-Trips*	
	<u>In</u>	<u>Out</u>
Hotel	61	51 (Rate from observations at Hilton)
Office	115	590
Light Manufacturing	32	177
Trucks	53	53
Air Cargo Employees	<u>44</u>	<u>84</u>
Total	296	955

*Assumes 9% transit use by all employees at Bird Island Flats and car occupancy of 1.4 for employees.

1987 PM PEAK HOUR WITH

FIG. A

ROADWAY IMPROVEMENTS NO BUILD



Memorandum to Mr. Norman Faramelli
 Director of Planning, Massport
 Ref: VHA #81-035
 Page 3

PM Peak hour distribution was developed per earlier analysis and is summarized below:

	<u>Tunnel</u>		<u>McLellan Highway</u>	<u>On Airport</u>
	<u>North</u>	<u>South</u>		
Office, Light Manufacturing and Air Cargo Employees	18%	28%	54%	0
Trucks	0	60%	40%	0
Hotel	0	50%	0	50%

Additional volumes on area roadways created by the development during the peak hour on a weekday afternoon are as follows:

1987 Peak Hour
 BIF Generated Trips

	<u>Tunnel</u>		<u>McLellan Highway</u>	<u>Airport</u>	<u>Total</u>
	<u>North</u>	<u>South</u>			
To BIF	44	84	138	30	296
From BIF	153	295	481	26	955

These volumes are added to the improved roadway system at Logan as shown in Figure B.

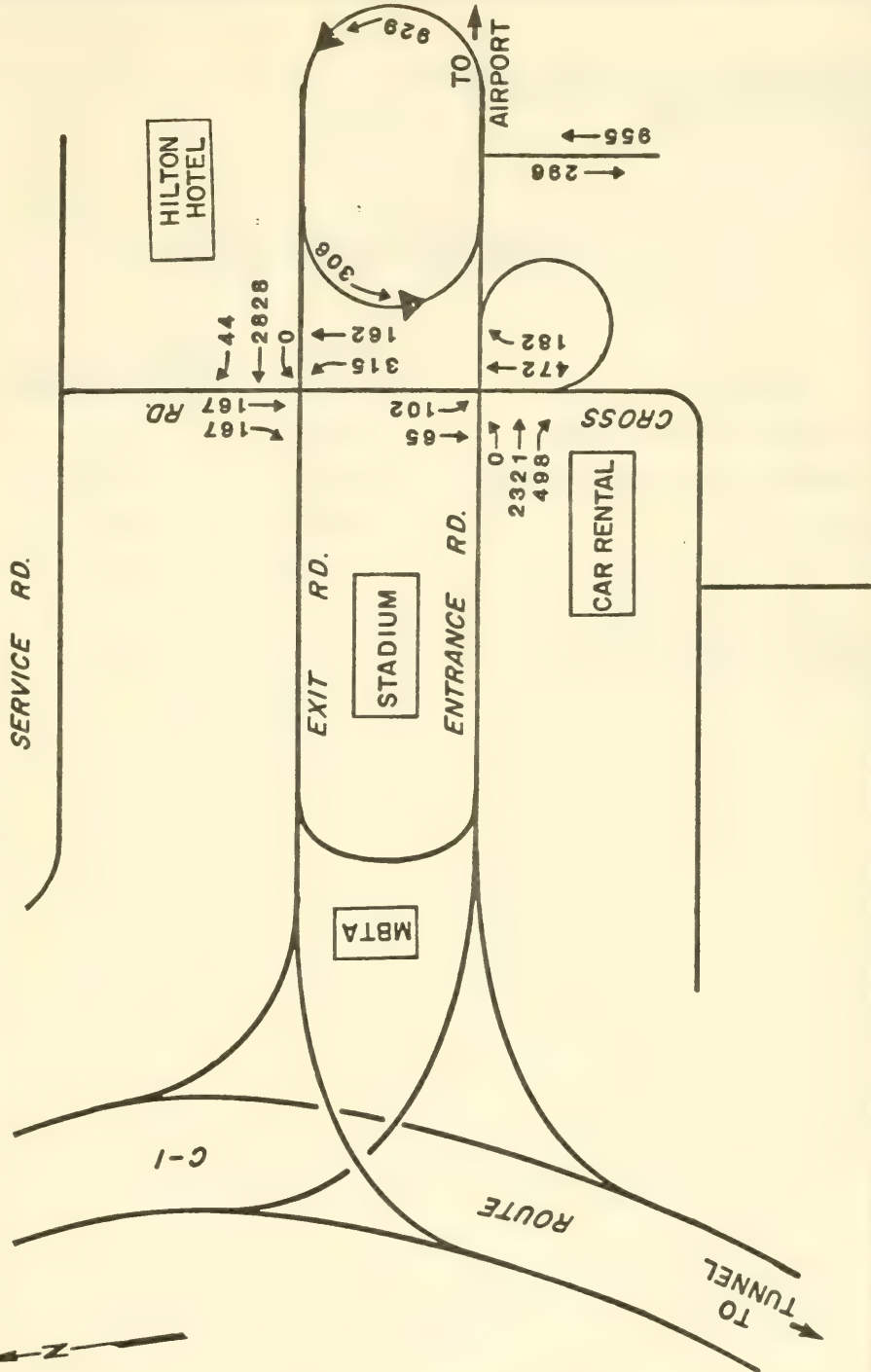
Analysis of the roadway improvements and fully mitigated FEIR shows significant improvement in operating levels of service over those previously reported. The following table summarizes results of our volume/capacity analysis.

1987 P.M. PEAK HOUR

FIG. B

GENERIC FEIR WITH FULL MITIGATION

SERVICE RD.



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Page 4

Volume/Capacity Ratios with
Full Mitigation and Roadway Improvements

<u>Location</u>	<u>1987 No Build</u>	<u>1987 Generic Development Plan</u>
Exit Road and Cross Road	0.81	1.05
Entrance Road and Cross Road	0.80	0.86
Tunnel	0.72	0.84
Central Artery Merge	1.13	1.20
Pedestrian Signal on Artery Frontage Road near Hanover Street	0.87	1.01

APPENDIX B - 4



BIRD ISLAND FLATS
TRAFFIC IMPACT ANALYSIS
RFEIR
HIGH TECH CENTER WITH
AIR CARGO FACILITIES

APRIL 28, 1981

ASSESSMENT OF MITIGATIVE MEASURES FOR

1987 NO BUILD

1987 HIGH TECH

1987 HIGH TECH WITH ROADWAY IMPROVEMENTS

PREPARED BY
VANASSE/HANGEN ASSOCIATES
184 HIGH STREET
BOSTON, MA 02210

Background

Massport has decided to develop property on Logan Airport known as Bird Island Flats. The property consists of filled land located in the southeast portion of Logan Airport. Proposed land use activity on the site consists of airport related activities such as air cargo and freight forwarding agents and various commercial activities. The commercial activities consist of a conference and exhibition center for high technology industries and a general office building.

The proposed development site is located on Logan Airport property and is accessible via the Harbor Tunnel, McClellan Highway and Airport Access Roadways.

The purpose of this memorandum is to report on the traffic impacts created by proposed Bird Island Flats Development. The analysis has been completed for 1987 assuming the entire project is in operation at that point in time.

Proposed Development

The land use activity proposed on Bird Island Flats was provided by Massport and its planning consultants. Information provided indicates the following activities will be constructed and operating in 1987:

- General Office Building - 120,000 square feet. Available for market tenants in the area.

- High Technology Exhibition Space - 500,000 square feet. Primarily oriented to private industry -- the majority of the center would only be open to visitors by invitation. A small public space would be provided as a "museum" for the high tech industry.
- Conference Center - 300 bedrooms. A center oriented to short-term (less than one week) duration conferences attended by high tech industry representatives from throughout the country.

Data

Traffic flow data was obtained from the sources listed in Table 1 and was adjusted to provide a balanced average weekday traffic flow, using control stations operated by Mass. DPW on Route C-1 and Logan Airport Ramps. Peak hour volumes were also balanced on the existing roadway network using ATR counts from Source #2 and hourly turning movements from Source #8. Both sources provided information obtained in April of 1979.

Traffic flow through the Sumner-Callahan Tunnel and Central Artery was derived from previous reports, existing Mass. Turnpike Authority counts and City of Boston information.

Base Condition

The impact of the proposed development was computed by estimating trips generated from the proposed activity and adding these trips to a base condition established for 1987. This base was

TABLE 1
TRAFFIC COUNTS

SOURCE

- 1) BOSTON-LOGAN INTERNATIONAL AIRPORT
VEHICULAR TRAFFIC SURVEY --
BRYANT ASSOC., INC. AUGUST 1979
- 2) ADJUSTED LOGAN AIRPORT TRAFFIC COUNTS --
CAMBRIDGE SYSTEMATICS, INC. APRIL 5, 1980
- 3) BOSTON CENTRAL ARTERY
1977 ORIGIN/DESTINATION SURVEY --
TIPPETTS-ABBETT-McCARTHY-STRATTON
NOVEMBER 1978
- 4) BOSTON REDEVELOPMENT AUTHORITY
1974 COUNTS @ CENTRAL ARTERY/NORTH STREET
ADJUSTED FOR STATE STREET RAMP CLOSURE
TELECON ALFRED HOWARD FEBRUARY 12, 1981
- 5) MASSACHUSETTS TURNPIKE AUTHORITY
1975-1980 SUMNER CALLAHAN TUNNEL COUNTS
H. BAKER TELECON FEBRUARY 12, 1981
- 6) MASSPORT
PRINTOUT OF JANUARY 26, 1980 - ADT & HOURLY
FLOWS ON AIRPORT RAMPS & C-1
- 7) SUMNER CALLAHAN HOURLY FLOWS
1977-1980 -- CTPS
- 8) TURNING MOVEMENT COUNTS AT AIRPORT
SIGNALS COPIED FROM BRYANT ASSOCIATES FIELD
NOTES BY R. SLOANE -- CTPS -- PROVIDED
FEBRUARY 10, 1981

developed by estimating traffic levels expected in 1987 through a growth factor applied uniformly to current conditions. An annual growth rate of 1.5 percent was applied to 1979 base volumes and resulted in a 13 percent increase in existing volume levels. The rate reflects changes in airport travel expected to 1987, but is conservatively high when compared to observed trends in peak hour traffic passing over major access roadways leading to Logan Airport.

Mitigative Measures to Current Airport Transportation Access Conditions

In order to improve operating conditions on airport roadways and increase accessibility to Logan Airport, Massport intends to institute a program of increased transit service and incentives to Massport employees to increase car occupancy. Massport staff believes these incentives and changes in transit service will result in the following:

- Employee use of transit to Logan Airport will increase from 6.6 to 7.3 percent of total trips.
- Employee car occupancy will increase from 1.2 to 1.4 persons.
- Airport passenger traffic use of transit will increase from existing levels of 14.7 percent to 16.2 percent of daily trips.

The consequences of implementing the programs indicated results in a reduction of private automobile use to and from Logan Airport.

Although the reduction is minimal, the measures are an appropriate response to current travel conditions. Our analysis shows implementation of the above will reduce peak hour traffic volumes to 95.7 percent of projected base conditions. For analysis purposes, this factor was applied to 1987 volumes prior to adding vehicle trips generated by the Bird Island Flats Development.

Figures 1 and 2 show 1987 projected volume conditions on the roadway network used to analyze potential project impacts. The volumes assume mitigative measures have been applied to airport traffic.

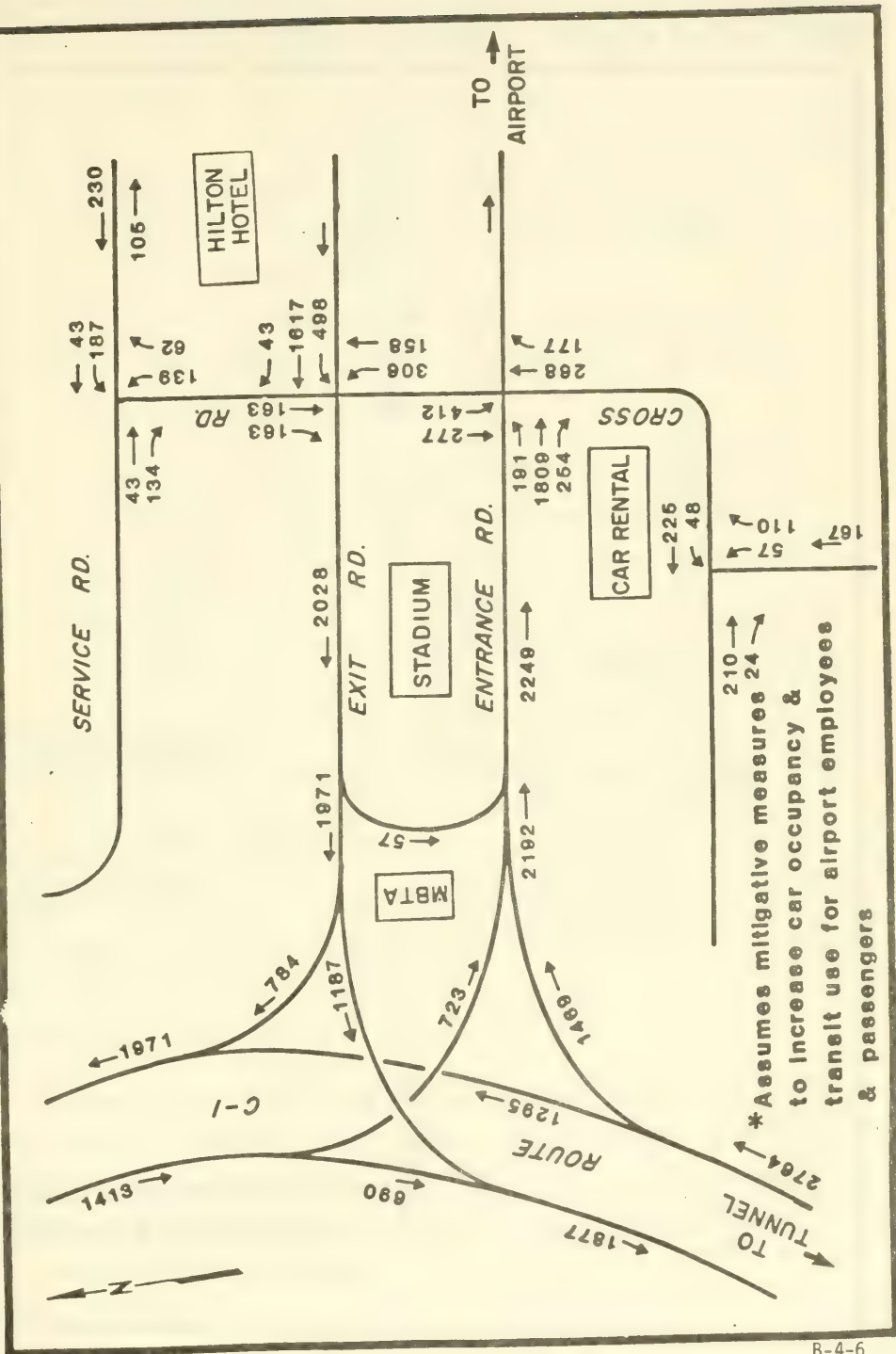
Projected Travel Demands -- High Tech Center

The amount of vehicle traffic generated by proposed high technology uses on Bird Island Flats was estimated on the basis of data provided by Massport and its consultants. Of particular importance were estimates of employees and visitation at the Conference Center and Exhibition Space. Information provided consisted of the following:

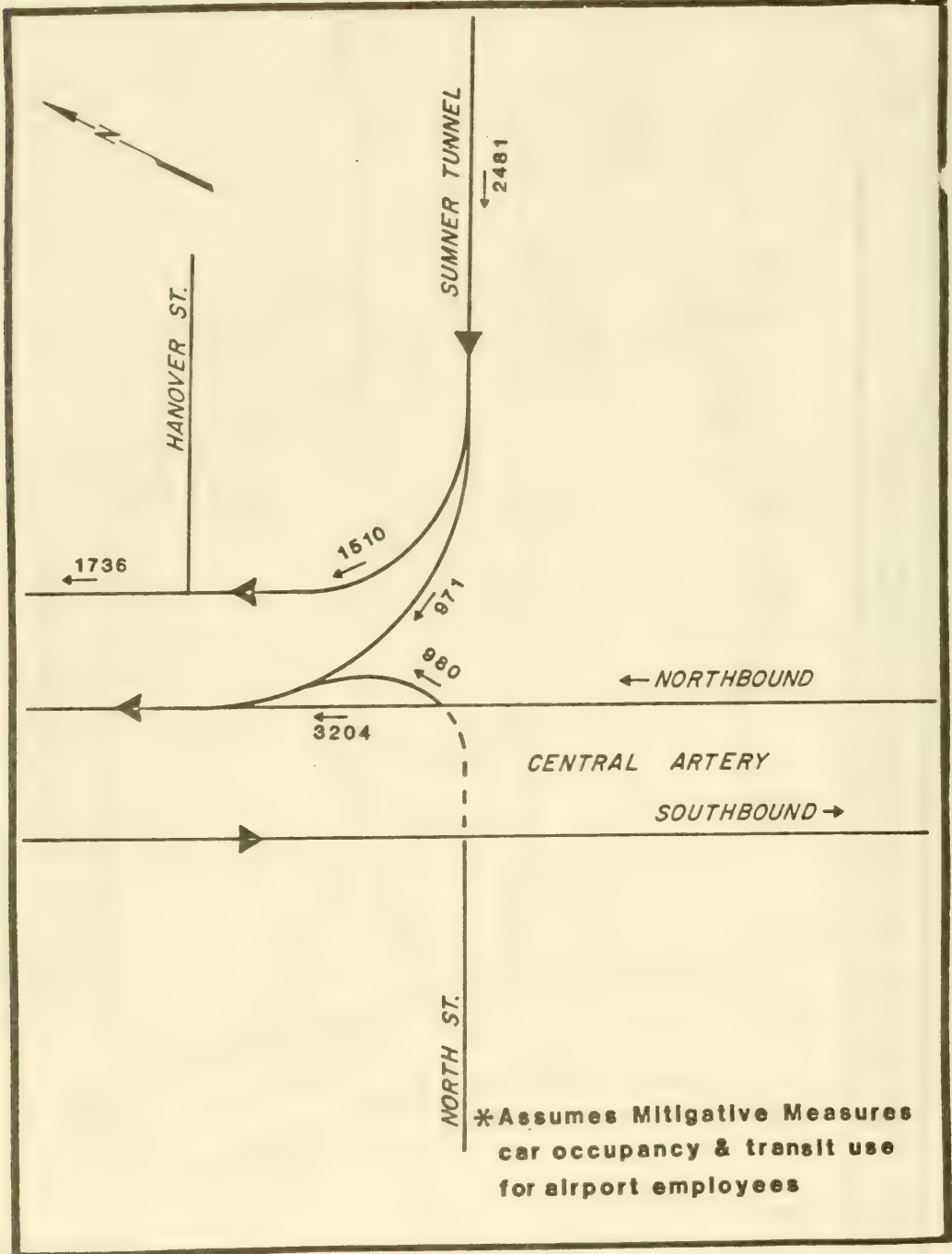
- Exhibition Space (500,000 square feet)
 - Total tenant and maintenance employees = 210
 - Total daily visitors = 675
 - 80% of visitors arrive by air and use shuttle bus/van to access the center
 - 20% of visitors arrive from local/regional areas

1987 PM PEAK HOUR BASE CONDITION*

FIG. 1



1987 PM PEAK HR-BASE CONDITION* FIG 2



- Conference Center (300 bedrooms)
 - Total employees = 180
 - Total daily visitors = 350
 - 60% of visitors arrive by air and use shuttle bus/van to access the center
 - 40% of visitors arrive from local/regional areas
 - The typical conference is attended only by residents of the conference center.

Estimates of peak hour automobile trips generated by the Exhibition Space and Conference Center were developed using the information presented above. The estimates were derived by examining employees and local visitors separately.

Since only local visitors will arrive by automobile, the traffic analysis examined travel patterns expected by this specific group of visitors. For analysis purposes, it was assumed visitors to the exhibition center would have similar travel characteristics as shopping trips, including car occupancy rates and temporal distribution. Visitors to the Conference Center were assumed to arrive and depart during normal commuter hours with no additional trips during the day. A car occupancy similar to area work trips was assumed for this activity.

Employees at both the Conference Center and Exhibition Center were assumed to exhibit travel characteristics similar to ITE generation rates for office space activity during peak afternoon commuter hours. It was also assumed 9 percent of all employees

would arrive at the site via transit and cross harbor ferry services.

The following table summarizes PM peak hour travel characteristics generated by the Conference and Exhibit Centers.

A. VISITORS' AUTOS -- CONFERENCE CENTER/EXHIBITION CENTER

<u>Activity</u>	<u>Daily Visitors</u>	<u>Visitor Arrivals By Auto</u>	<u>Car Occupancy</u>	<u>Daily Auto Arrivals</u>	<u>PM Peak Hour Autos</u>	
					<u>In</u>	<u>Out</u>
Conference Center	350	140	1.4	100	0	50 ^{1/}
Exhibition Center	675	135	1.65	82	6	62 [/]
TOTAL	1,025	275	N/A	182	6	56

B. EMPLOYEES' AUTOS -- CONFERENCE CENTER/EXHIBITION CENTER

<u>No. of Employees</u>	<u>Percent by Auto</u>	<u>Employees by Auto</u>	<u>Daily Auto Arrivals</u>	<u>PM Peak Hour Autos^{3/}</u>	
				<u>In</u>	<u>Out</u>
390	91	355	253	29	159

C. VISITORS BY SHUTTLE BUS -- CONFERENCE CENTER/EXHIBITION CENTER^{4/}

<u>Daily Visitors</u>	<u>Visitors by Auto</u>	<u>Visitors by Shuttle</u>	<u>Average Occupancy/ Shuttle</u>	<u>Daily Shuttle Arrivals</u>	<u>PM Peak Hour Shuttle Bus</u>	
					<u>In</u>	<u>Out</u>
1,025	275	750	30	25	13	13

1/ Assumes visitors leave in two-hour period from 4-6 PM.

2/ Percent distribution In and Out from retail person trip.

3/ ITE auto rate/employee for general office building.

4/ Assumes shuttle bus operation carries visitors to air terminals with half of all visitors leaving in PM peak hour on peak day.

Projected Travel Demands - General Office Building

A proposed satellite office building of 120,000 square feet is expected to create travel demands at a rate similar to office space found in the Boston urban area. Using person-trip rates of 16 person-trips per day per 1,000 square feet as observed by Wilbur Smith & Associates in the Boston CBD, a transit usage factor of 9 percent and car occupancy rate of 1.4, we arrived at a daily auto trip rate of 10.4 vehicles per 1,000 square feet.

Activity	Amt.	Unit	Daily Rate/Unit		Daily Total Trips		PM Peak Hour Rate/Unit		PM Peak Hour Trips	
			In	Out	In	Out	In	Out	In	Out
Office	120	1,000 SF	5.2	5.2	624	624	0.23	1.18	28	142

Projected Travel Demands -- Air Cargo Facility

Employees and truck traffic generated by new air cargo handling and freight forwarding facilities will also add traffic to the Bird Island Flats access roads. The proposed cargo facilities will consist of 444,000 square feet of development. Trip generation rates have been estimated by Massport through observation of existing cargo/freight forwarding activities on Logan Airport. Observed rates are summarized below:

AIR CARGO AT LOGAN Vehicle Trips/1,000 Sq. Ft.

	Daily Rate Two-Way	Daily Trips Two Way	PM Peak Hour Rate		Peak Hour Trips	
			In	Out	In	Out
Autos	3.7	1,643	.12	.23	53	102
Trucks	5.5	2,442	.12	.12	53	53

Massport believes the existing vehicle trip rate for Air Cargo employees can be reduced by providing incentives for carpooling and use of transit. These incentives are expected to decrease auto trip rates by 20 percent and have been used in the traffic analysis of potential development impacts.

AIR CARGO PROJECTED EMPLOYEE VEHICLE TRIPS
WITH MITIGATION MEASURES

<u>Daily</u>		<u>PM Peak Hour</u>	
<u>In</u>	<u>Out</u>	<u>In</u>	<u>Out</u>
650	650	44	84

Projected Travel Demands -- Summary

The following table summarizes vehicle trips from each of the land use components proposed for Bird Island Flats. Both afternoon peak hour (4-5 PM) and daily trips are provided.

SUMMARY - VEHICLE TRIP GENERATION TABLE

<u>Activity</u>	<u>PM Peak Hour</u>		<u>Daily</u>	
	<u>To BIF</u>	<u>From BIF</u>	<u>To BIF</u>	<u>From BIF</u>
Conference Center	0	50	100	100
Exhibition Center	6	6	82	82
High Tech Employees	29	159	250	250
Satellite Office Bldg.	28	142	624	624
Shuttle Bus	13	13	25	25
Air Cargo Employees	44	84	650	650
Air Cargo Trucks	<u>53</u>	<u>53</u>	<u>1,220</u>	<u>1,220</u>
Total Cars	107	441	1,706	1,706
Total Trucks & Buses	<u>66</u>	<u>66</u>	<u>1,245</u>	<u>1,245</u>
Total Vehicles	173	507	2,951	2,951

Trip Distribution

New trips created by the BIF High Tech/Office/Cargo development were assigned to the roadway system in the following manner. High Tech Employees, Air Cargo Employees and Satellite Office Building trips were assumed to have the same trip distribution as current Massport employees. Trucks and buses were distributed according to observations of existing patterns and all High Tech Conference Center/Exhibition Center visitors arriving from local sources were assigned to the Sumner/Callahan Tunnel. This assumption is based on statements by Massport consultants that the Conference/Exhibition Center would be oriented to high tech industries and institutions located in Boston/Cambridge or the western suburbs. This provides a worst case scenario since all visitor vehicle trips are assigned to the Harbor Tunnel complex. The following table summarizes the trip distribution used for the new trips generated by BIF activities.

VEHICLE TRIP DISTRIBUTION
Percentages

<u>Activity</u>	<u>McClellan Highway</u>	<u>Tunnel To/From North</u>	<u>Tunnel To/From South</u>
High Tech, Air Cargo Employees and General Office Building	54%	18%	28%
Conference Center	0%	50%	50%
Exhibition Center	0%	50%	50%
Air Cargo Trucks	40%	30%	30%

The following table shows actual numbers of vehicles arriving/ departing on the major access roads to Bird Island Flats for the PM peak hour.

Activity	PM Peak Hour - Added Trips					
	McClellan Highway		Tunnel/ Central Artery North		Tunnel/ Central Artery South	
	To BIF	From BIF	To BIF	From BIF	To BIF	From BIF
High Tech, Air Cargo Employees and General Office Building	55	208	18	69	28	108
Conference Center	0	0	0	25	0	25
Exhibition Center	0	0	3	3	3	3
Air Cargo Trucks	21	21	16	16	16	16
TOTAL	76	229	37	113	47	152

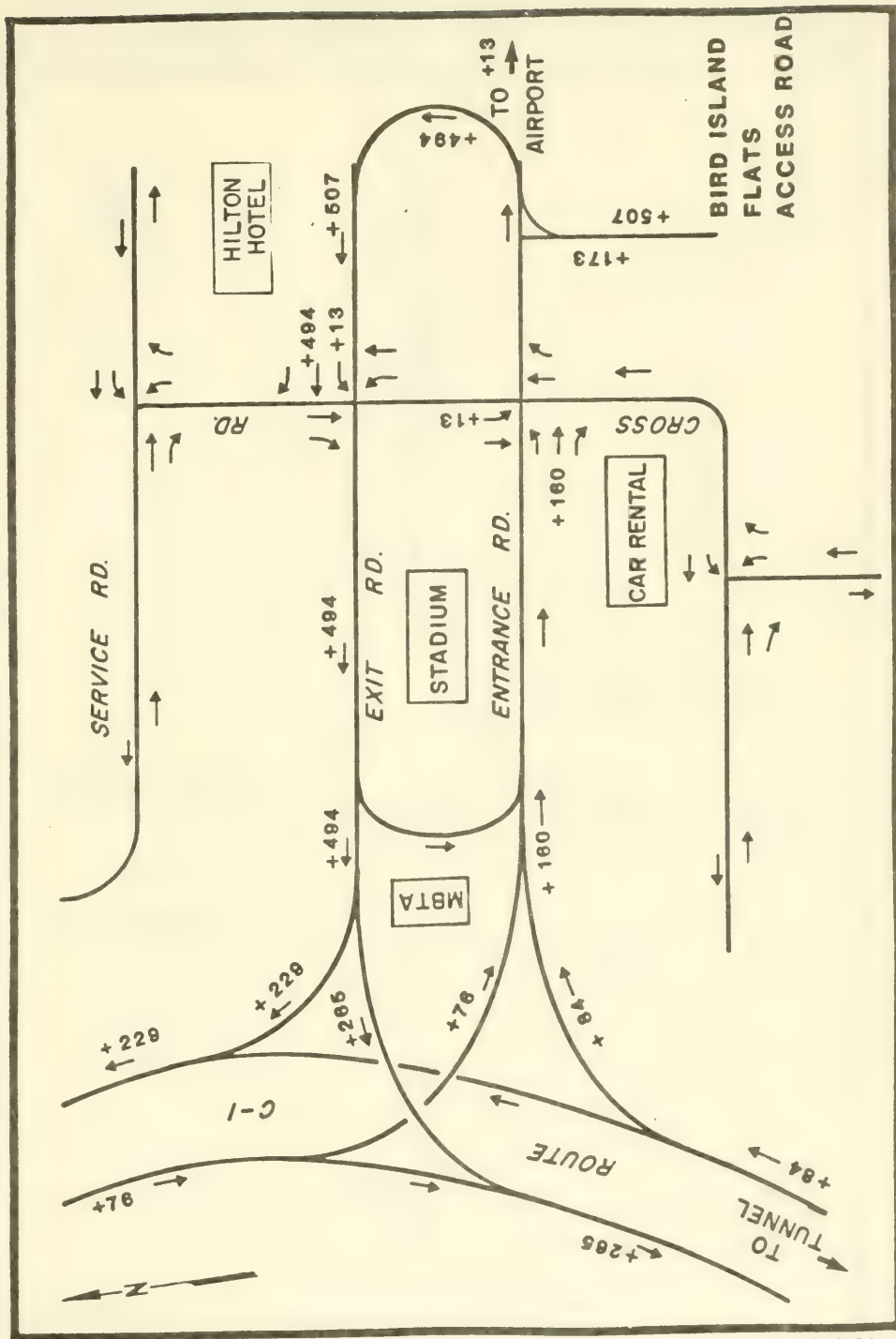
Figures 3 and 4 show trips on the area roadways as generated by BIF land use activity for the 1987 PM peak hour. These trips were then added to the existing roadway network and the resultant volumes are shown in Figures 5 and 6.

Volume Capacity Analysis

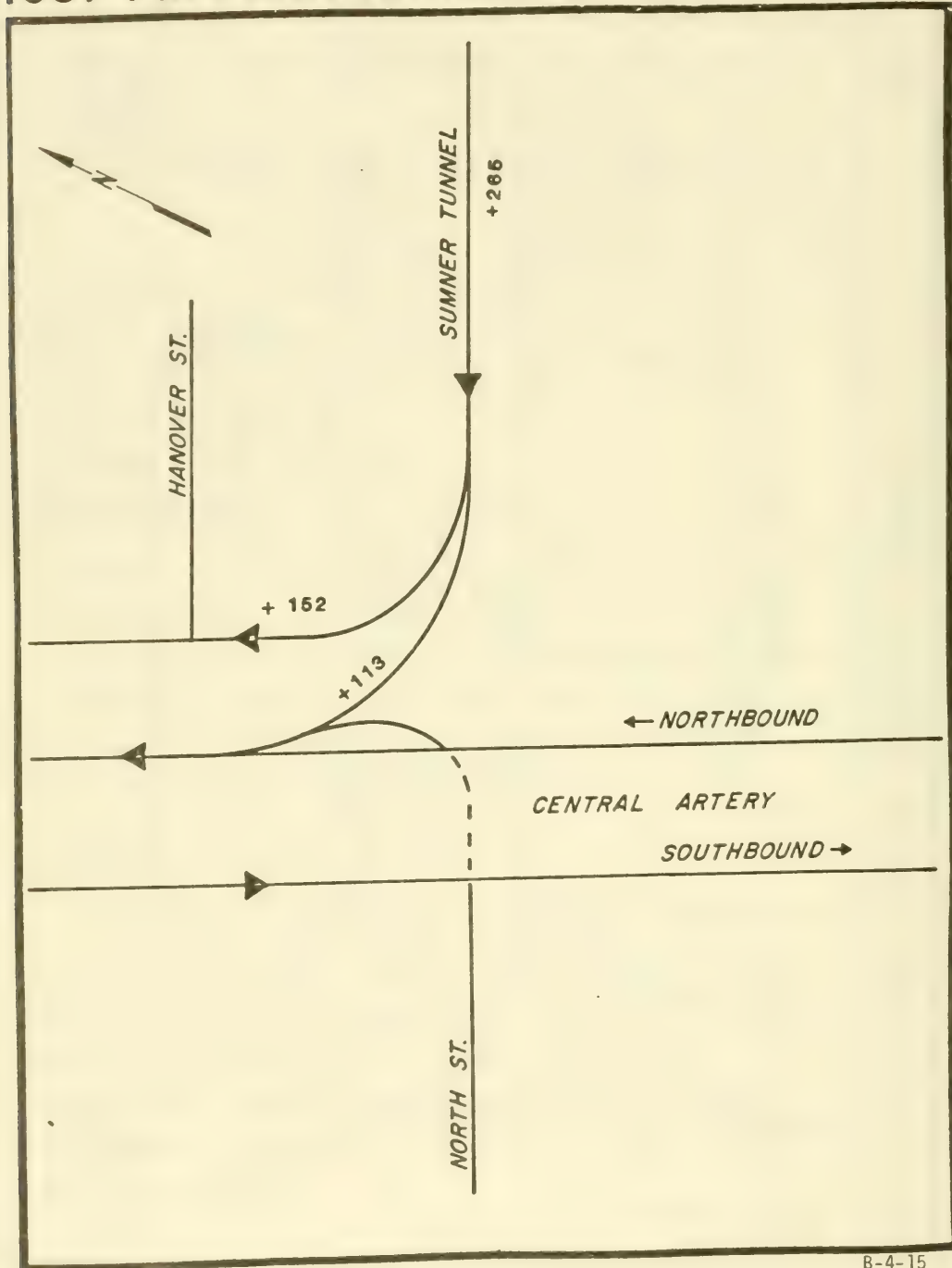
Impacts of the proposed BIF development on existing streets and roadways serving the site were developed through capacity analysis. Two critical areas were examined during the PM peak hour: (1) the Sumner/Callahan Tunnel Complex and the tunnel interface area with the Central Artery; and (2) the signalized intersections on the airport entrance/exit roadways. A preliminary

1987 PM PEAK HOUR ADDED TRIPS

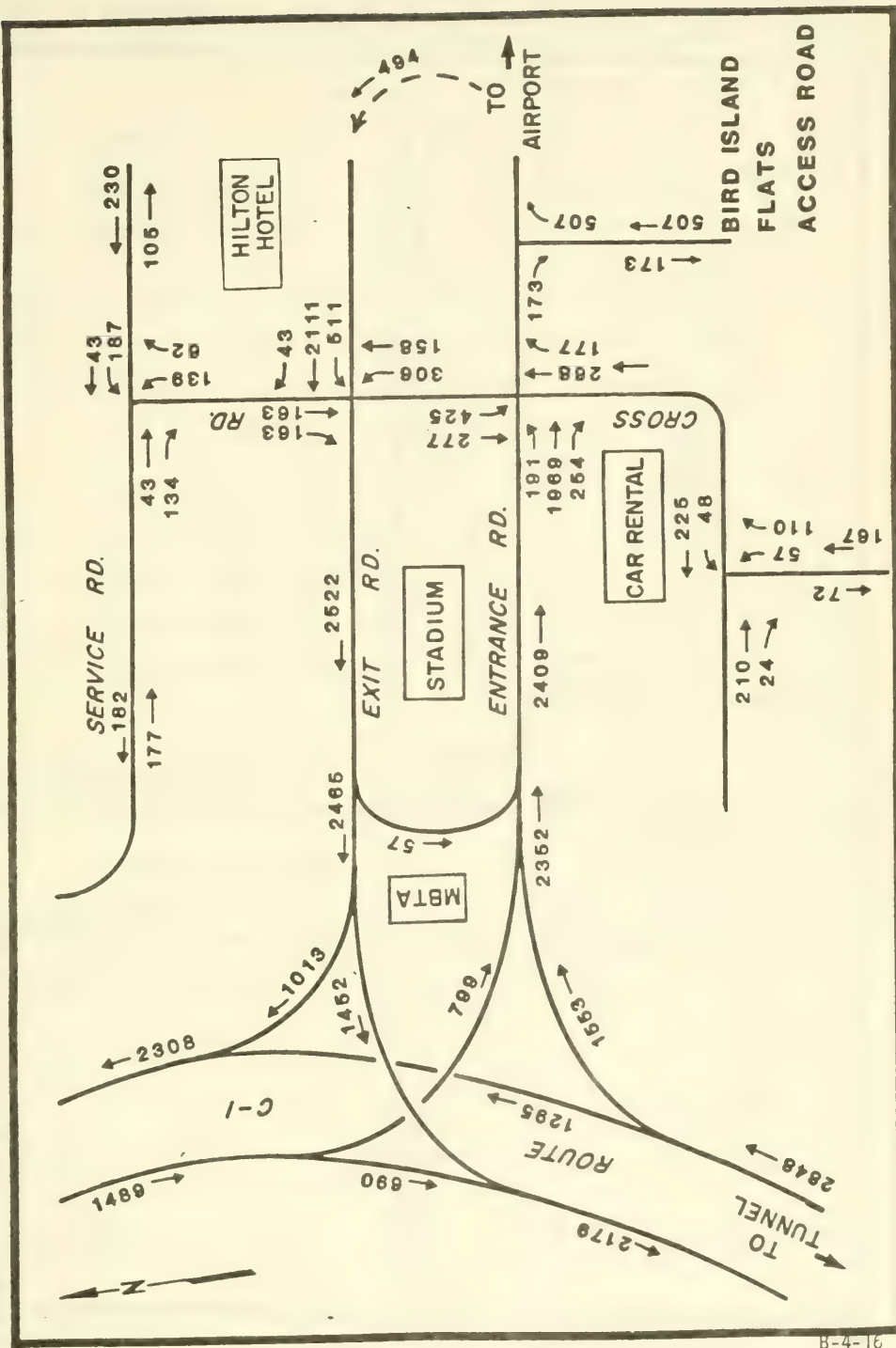
FIG. 3



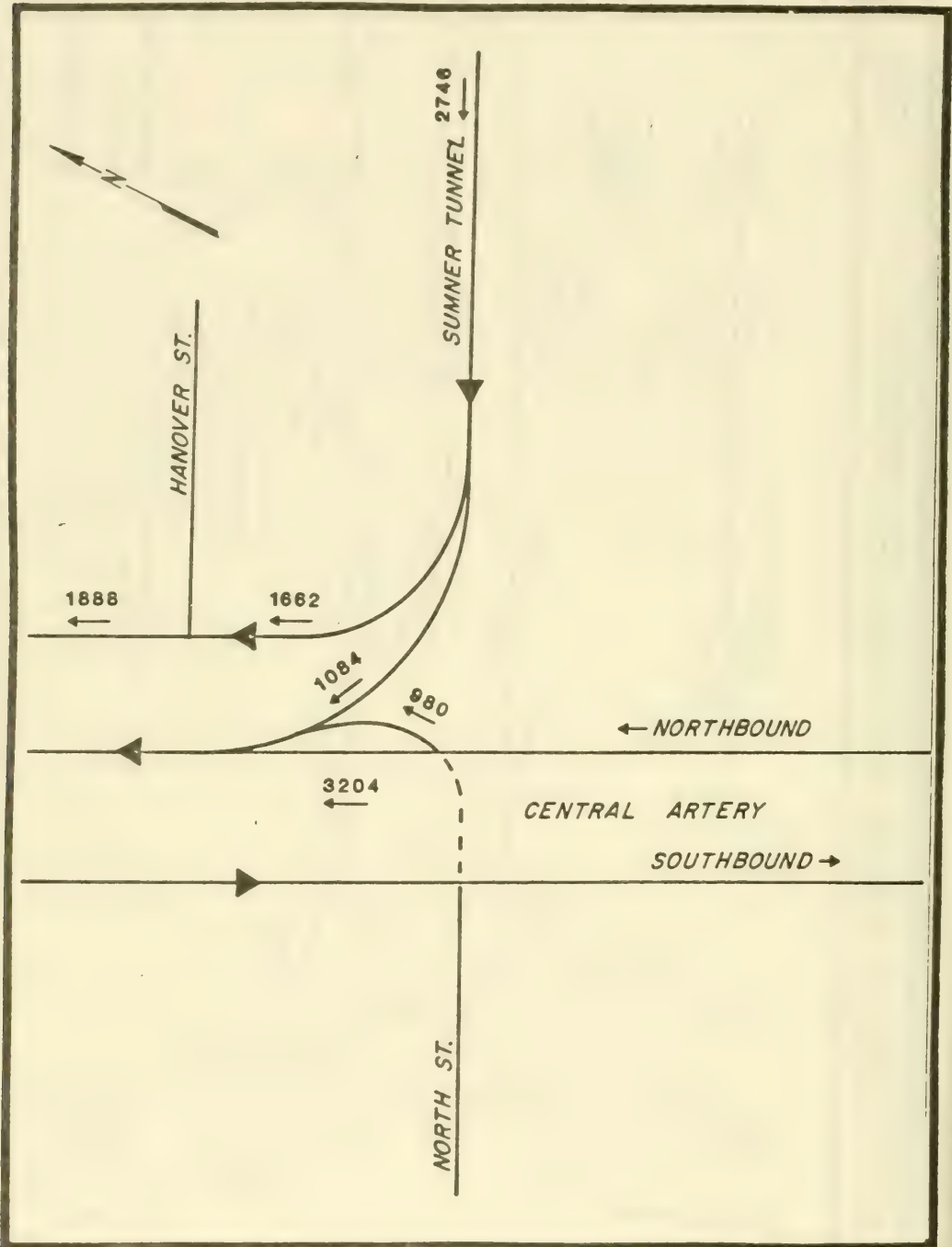
1987 PM PEAK HR ADDED TRIPS FIG. 4



1987 PM PEAK HOUR WITH DEVELOPMENT FIG. 5



1987 PM PEAK HR/DEVELOPMENT FIG. 6



analysis of Airport ramp merge and diverge points on Route C-1 indicates no capacity constraints at these locations. In the projected PM peak hour it appears all ramp control points are capable of operating at adequate levels of service. The critical areas are discussed in the following sections of this report.

The two signalized intersections on the airport property are currently operating at Level of Service "D" during an average weekday (4-5 PM) time period. In 1987, under projected growth conditions without development on Bird Island Flats, level of service at the intersections deteriorates to Level of Service "E" (capacity). Construction of a High Tech Center, Office Building and Air Cargo Facilities creates traffic flows that are in excess of current roadway capacities. Table 2 summarizes level of service conditions by indicating volume/capacity ratios.

TABLE 2
LEVEL OF SERVICE SUMMARY

<u>Location</u>	<u>PM Peak Hour Volume Capacity Ratios</u>			
	<u>1979</u>	<u>1987 No Build</u>	<u>1987 High Tech Center</u>	<u>1987 High Tech Center with Roadway Improvements</u>
Entrance Road @ Cross Road	0.87	0.93	0.99	0.84
Exit Road and Cross Road	0.88	0.95	1.15	0.94
Tunnel	0.65	0.72	0.79	0.79
Central Artery Merge	1.01	1.13	1.18	1.18
Frontage Road @ Pedestrian Signal	0.79	0.87	0.94	0.94

Capacity of the Callahan Tunnel is the critical roadway element subjected to additional traffic created by BIF development. There are three elements of the Tunnel complex which constrain vehicular flows and have been investigated as part of the BIF traffic impact study. These elements are: (1) the Callahan Tunnel capacity, (2) the pedestrian signal on the Central Artery frontage road north of Hanover Street, and (3) the Central Artery northbound on ramp merge point with through traffic. Figure 6 shows projected volumes passing through the three critical areas during the 1987 (4-5 PM) time period.

As shown in Table 2, the volume capacity ratios of the three check points increase with the development of Bird Island Flats. Level of service at the Frontage Road pedestrian signal changes from Level D to Level E (capacity). The Central Artery merge is currently at capacity and cannot accommodate additional flows. The Tunnel link appears to have the capability of processing additional vehicles but this will be restrained by external control points.

Roadway Improvements

Signalized intersections at the airport have been recognized as a constraint on traffic level of service and Massport is in the process of developing a plan of action for upgrading these locations. There are many alternatives which remain to be investigated as part of a short-range traffic improvement plan for Logan.

Several of these alternatives present an opportunity for significantly increasing capacity and have not been evaluated in this effort. One set of improvements included in the document for evaluation purposes consists of the following elements:

- (1) Elimination of U-turn traffic from Airport Exit Road to Entrance Road via left-turn onto the north-south Cross Road. This movement would be permitted on a new turning ramp constructed across the infield east of the north-south cross road. Accordingly, U-turn traffic will not pass through the signalized intersections.
- (2) All left turns will be prohibited from the westbound Airport Exit Road to southbound Cross Road. Vehicles completing this maneuver will be required to use the MBTA bus ramp.
- (3) Construction of a jug-handle ramp at the Entrance Road/Cross Road intersection to accommodate left-turn vehicles from eastbound Entrance Road to northbound Cross Road.
- (4) Construction of an access road to Bird Island Flats approximately 700 feet east of the existing north-south Cross Road. This configuration requires all BIF exiting traffic to leave the site via a U-turn through the Central Parking access road.

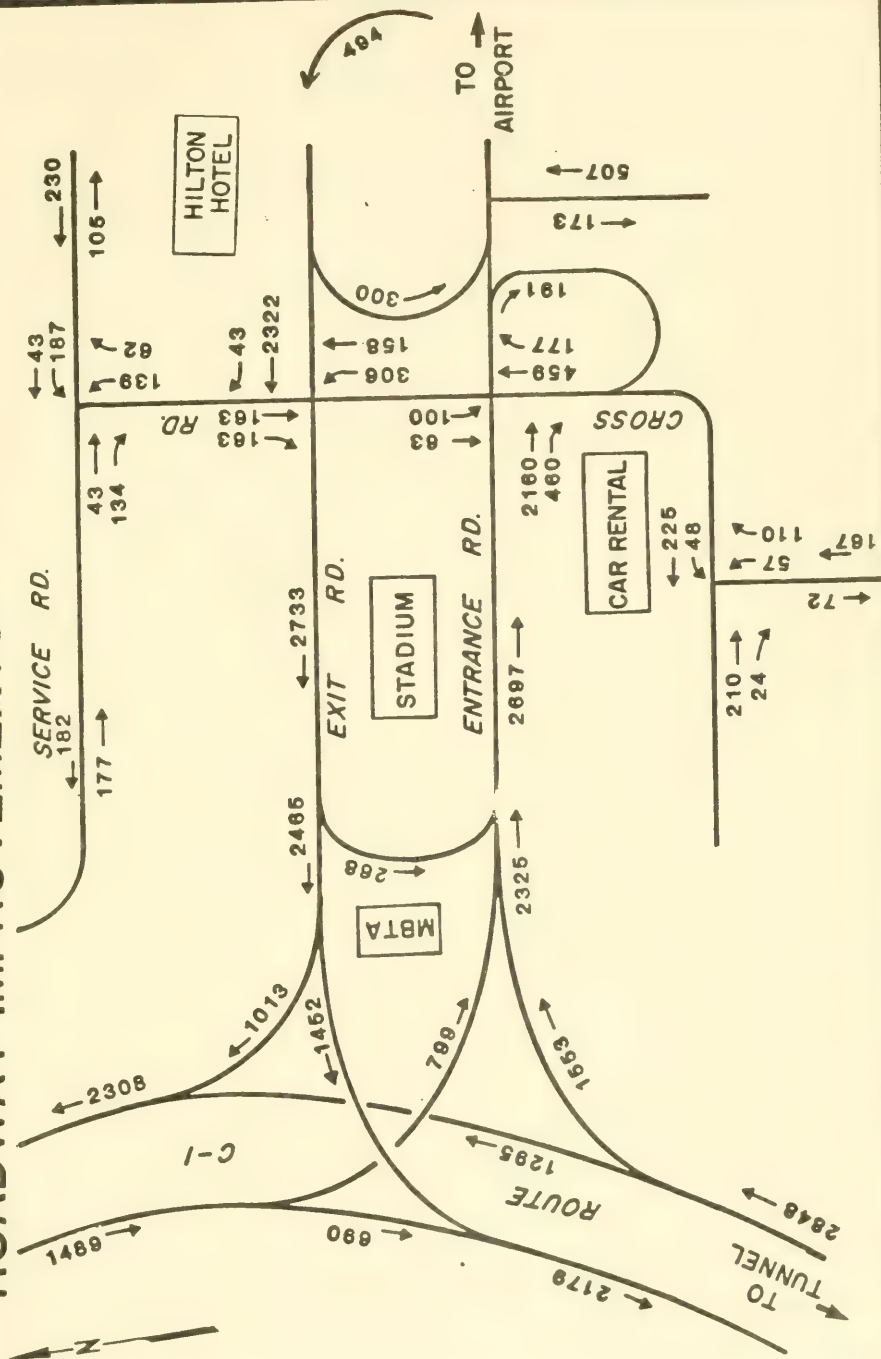
As shown in Table 2, the proposed roadway improvements result in significant increase in traffic performance levels at the signalized intersections. Both intersections, as improved, are expected

to operate at or better than levels of service expected in 1987 with no development on Bird Island Flats.

Figure 7 shows peak hour volumes with BIF development and proposed roadway improvements.

1987 PM PEAK HOUR WITH DEVELOPMENT & FIG. 7

ROADWAY IMPROVEMENTS





APPENDIX B - 5

To: Ted Baldwin
From: Gordon Lewin
Date: March 11, 1981
Re: Demand estimate for ferry service at BIF

Estimate of demand for ferry service at BIF is based on a Feasibility Study for Cross Harbor Ferry Service completed in January by Karen Pearson of the Planning Department.

Pearson's market projections are based on residential location. She identifies the market for ferry service to be residences within walking distance of Long Wharf: the North End, Chinatown, Beacon Hill, and the Financial District.

Pearson projects that if 20% of the potential walk-to-Long Wharf market uses the ferry, the service would achieve a demand of 33 people per hour.

While these are preliminary estimates, I assigned 33 people as the peak hour BIF work force which would use the service. The market would equal 1.8% of total peak hour generation based on employment projections for full office development (see my memo of Feb. 12th, p.4).

I must emphasize that the estimate is preliminary and most likely underestimates the peak hour impact since ferry trips are distributed equally throughout the day in Pearson's report.

cc: Norman Faramelli

APPENDIX B - 6

To: Ted Baldwin
From: Gordon Lewin
Date: March 12, 1981
Re: Impact of MBTA pass on transit use

Payroll deduction plan

Sale of MBTA monthly passes at full cost to employees through payroll deduction results in a small shift from auto to transit use. According to MBTA surveys, 9.6% of passholders are new to public transit when passes are sold through payroll deduction. At CBD businesses, 12.5% of employees use the pass. Thus, it can be estimated that payroll deduction results in a 1.2% mode shift to transit from automobiles.

Subsidization of passes

Massport currently subsidizes 50% of the cost of MBTA passes to employees. Introduction of the subsidization program increased pass sales by a six fold. A Massport survey found that 28% of passholders were new to public transportation. (An MBTA survey of other companies found new transit use due to subsidization of passes ranged from 26%-33%.)

In the Massport case, the actual number of passes sold increased by 120. Twenty-eight percent of these sales were people who were formally auto users--which equals 34 new transit users. I believe that Massport employees 340 people which would mean that subsidization resulted in a 10% shift in mode use to transit.

cc: Norman Faramelli

APPENDIX B - 7

Massachusetts Port Authority

Inter Office Memorandum

Joe Brevard

Subject Lower Bound Aviation Forecasts

Alan Eng

Date August 26, 1980

Introduction

This memorandum forecasts the lower bound scheduled air carrier passenger and flight movements at Boston Logan International Airport from the base year 1980 to the year 2000 as a basis for airport ground transportation planning. The previous memorandum, dated April 16, 1980, recorded the "upper bound" Logan forecast for the terminal and airport land use planning purposes.

Due to the recent economic upsets, inflation, recession, deregulation and continual skyrocketing of fuel prices, many economic indicators reflecting the well-being of the airline industry have been slipping in the recent few months when compared to the indicators in early 1980. Therefore, these lower bound forecasts, tuned with less optimistic assumptions, are intended to project a future Logan activities scenario holding the present economic environment to be the same throughout the coming two decades.

Summary of the Forecasts

Passenger movements:

Total passenger movements by the scheduled carriers at Boston will grow from 15.3 million in 1980 to 28.80 million by the year 2000, for an average annual growth rate of 3.1 percent. Total passenger movements by trunk and regional carriers in scheduled service will grow at a lower average annual rate of 3.0 percent to the year 2000. As commuter carriers are in good traffic years, it is assumed that the commuter carrier passenger movements will follow the "upper bound" forecasts' average annual growth rate of 3.9 percent (April 16 memo). Because of increasing incoming passengers from foreign countries and vigorous international air fare competition in the US-foreign markets during the recent deregulated years, a crude estimate shows scheduled international passenger movements including U.S. and Foreign Flag carriers will grow from 3.2 million (assuming all wide-bodied flights are international operations) in 1980 by a factor of three to over 9.8 million (assuming half of the projected scheduled wide-bodied flights are international operations) by the year 2000 for an average annual growth rate of 5.6 percent.

Table 1, below, shows the passenger movements forecast for the different types of scheduled service by 5 year increments from 1980-2000.

Table 1

Annual Passenger Movements by Carrier Group (10⁶)

Year	Scheduled Certificated	Av. Annual % Δ	Scheduled Commuter	Av. Annual % Δ	Scheduled Total	Av. Annual % Δ
1980	14.2	--	1.10	--	15.3	--
1985	15.7	2.0	1.40	4.8	17.1	2.2
1990	18.1	2.5	1.70	1.8	19.8	2.3
1995	22.1	4.4	2.10	6.7	24.2	2.4
2000	26.4	3.6	2.40	2.7	28.8	3.5

Aircraft movements:

Table 2, below, shows the forecasts of average day-peak month aircraft movements for the base year, 1980 and 5 year incremental forecasts from 1980-2000 for the scheduled service in Boston.

Table 2

Average Day - Peak Month Aircraft Movements by Carrier Group

Year	Standard Bodies	Av. Annual % Δ	Wide Bodies	Av. Annual % Δ	Commuter	Av. Annual % Δ	Total	Av. Annual % Δ
1980	576	--	73	--	419	--	1,085	--
1985	524	1.9	147	1.4	365	2.8	1,036	0.9
1990	443	3.3	200	6.2	322	2.5	1,249	3.7
1995	369	3.6	286	7.2	293	0.2	948	5.5
2000	289	4.9	354	4.3	306	0.9	949	0.0

Table 3 presents average day-January aircraft movements and its aircraft seating capacity from 1980 to 2000. Tables 4 to 8 give peak hour-average day-peak month (PHADPM), average day-peak month (ADPM), peak month and annual passengers and operations by aircraft types by 5 year increments from 1980 to 2000. Table 9 summarizes the two aviation forecasts in passenger movements at Logan.

Assumptions and Approaches:

The basic assumptions of this forecast are similar to the "upper bound" forecasts with the exception of the following: First, the rate of increase in domestic wide-bodied carrier movements is decreased 50% in the years 1980-1990 and is lessened 80% in the 1990's. Second, in the international market, the replacement rate of 2-3 engine wide-bodied carriers is assumed to be slower than the "upper bound" forecasts, from a

.8 - 4.4 % range to 0.5 - 3.0 % range, but the 4-engine wide bodies will be the same in operations as in the "upper bound" forecasts. This assumption will decrease the international aircraft operations to a lesser extent than the domestic carrier operations.

In addition, it is assumed that load factor per aircraft movement will have a smaller increase as projected earlier. The recent monthly statistics show that because of the excess capacity in air carrier service under severe competition and the reshuffling of the industry under deregulation, the load factor assignment would not be higher than 66 percent in average and the increase in load factor per scheduled operation would come into effect at about 5 years behind the "upper bound" forecasts projected. Henceforth, the load factor assignment for all carrier types for the year 1980 is 0.66; 1985, 0.68; 1990, 0.70; 1995, 0.72; and for the year 2000, it is 0.74.

As a result of these changes, aircraft operations and passenger movements will grow at a much slower rate than the previous upper bound forecasts. In terms of foreseeable aeronautical technology improvement, seating capacity will be the same as projected before.

Peak hour - average day - peak month (PHADPM) approach, as described in the April, 1980 memo, will be effectively the same in terms of converting from PHADPM to average day - peak month (ADPM), to peak month and to annual total. The conversion factors being used in the "upper bound" forecasts, remain the same in this lower bound estimate simply because of historical data involved in this conversion calculation.



Alan Eng

AE:b1

cc : Norm Faramelli
: H. Conover
: K. Pearson
: R. Marchi
: T. Baldwin
: A. Bratt
: file

TABLE 3 : Daily flights Forecasts and Seating Capacity Forecasts

(Average Day January)

Aircraft Type	1980		1985		1990		1995		2000	
	Number	Seating Capacity	Number	Seating Capacity	Number	Seating Capacity	Number	Seating Capacity	Number	Seating Capacity
Propeller Aircraft										
Less than 10 seats	172	8	60	8	—	—	—	—	—	—
10-20 seats	120	15	123	15	112	15	12	15	—	—
20-35 seats	13	27.5	34	27.5	12	27.5	—	—	—	—
35-45 seats	—	—	44	37.5	124	37.5	188	37.5	142	37.5
45-60 seats	13	52.5	18	52.5	16	52.5	12	52.5	30	52.5
Total (Propeller)	318		279		244		222		232	
Standard Body Jet										
2 engine	116	110	134	120	148	120	156	120	160	120
3 engine	270	115	244	120	181	120	121	120	57	153
4 engine	51	135	19	145	7	150	2	150	2	153
Total (Standard Body)	437		397		336		279		219	
Wide Body Jet										
2 engine	—	—	46	190	92	190	107	200	140	237.5
3 engine	48	265	50	250	58	260	68	270	74	275
4 engine	8	375	15	425	21	435	42	475	54	500
	56		111		151		217		268	
Total (All Departures)	811		787		721		718		719	

TABLE 4 : PASSENGER FORECASTS FOR YEAR 1980

Fleet Mix	OPERATIONS			SEATS AVAILABLE		PASSENGERS			
	Av. Day January	Av. Day Peak Mo.	Peak hr/ av. day p.m.	Av. day Peak Month	Peak hr/ av. day Peak Month	Av. day/ Peak Month	Peak Hour av. day p.m.	Peak Month (10 ⁶)	Annual (10 ⁶)
<u>Certificated</u>									
Std Body: 2 engine	116	153	11.5	16,830	1262	9,255	833	0.248	0.961
3 "	270	356	26.5	40,940	3,070	22,510	2,026	0.698	6.711
4 "	51	67	5.0	9,045	678	4,970	447	0.134	1.481
Wide Body: 3 "	48	63	4.5	15,750	1,181	8,117	780	0.269	2.586
4 "	8	10	0.5	3,950	296	2,168	195	0.067	0.664
Sub Total	493	649	48	86,515	6,487	47,570	2,481	1.475	14.183
<u>Commuter</u>									
Less than 10 seats									
10-20 seats	172	227	11.0	1,818	136	1,188	107	0.036	0.30
25-35 "	120	158	11.5	2,370	172	1,466	132	0.045	0.40
30-45 "	13	17	1.3	467	354	277	27	0.009	0.20
45-60 "	13	17	1.3	892	58	518	317	0.017	0.20
Sub Total	318	419	26.2	5,565	417	3,519	583	0.169	1.10
Total	811	1,068	72.5	92,060	6,904	51,089	3,064	1.584	15.28

TABLE 5: PASSENGER FORECASTS FOR YEAR 1985

Fleet Mix	OPERATIONS			SEATS AVAILABLE		PASSENGERS			
	Av. Day January	Av. Day Peak Mo.	Peak hr/ av. day p.m.	Av. day Peak Month	Peak hr/ av. day Peak Month	Av. day/ Peak Month	Peak Hour av. day p.m.	Peak Month (10)	Annual (10 ⁶)
Certificated									
Std Body: 2 engine	134	177	13.3	21,250	1,596	17,060	1,085	0.374	3.594
3 "	244	322	24.0	38,400	2,888	21,760	1,958	0.675	6.486
4 "	19	25	19	3,667	275	2,078	187	0.044	0.619
Wide Body: 3 "	46	61	4.6	11,653	874	6,604	594	0.205	1.968
4 "	50	66	5.0	16,667	1,250	9,444	850	0.293	2.815
	15	20	0.2	1,133	85	642	58	0.020	0.191
Sub Total	508	671	49.0	92,800	6,960	52,587	4,733	1.630	15.675
Comuter									
Less than 10 seats	60	79	6	632	47	388	35	0.012	0.1
10-20 seats	123	162	12	2,430	182	1,512	136	0.047	0.5
25-35 "	34	45	3	1,237	92	966	60	0.024	0.2
30-45 "	44	58	4	2,175	163	1,355	122	0.042	0.4
45-60 "	18	24	2	1,260	94	777	70	0.024	0.2
Sub Total	274	365	27	7,784	578	4,737	432	0.149	1.4
Total	782	1,036	76	100,584	7,538	57,384	5,165	1.779	17.075

TABLE 6 1 PASSENGER FORECASTS FOR YEAR 1990

Fleet Mix	OPERATIONS			SEATS AVAILABLE		PASSENGERS			
	Av. Day January	Av. Day Peak Mo.	Peak hr/ av. day p.m.	Av. day Peak Month	Peak hr/ av. day Peak Month	Av. day/ Peak Month	Peak hour av. day p.m.	Peak Month (10 ⁶)	Annual (10 ⁵)
<u>Certificated</u>									
Std Body: 2 engine	148	195	14.6	23,360	1,752	13,627	1,226	0.422	4.062
3 "	151	239	18.0	28,600	2,160	16,800	1,512	0.521	5.008
4 "	7	9	0.7	1,400	105	817	73	0.005	0.243
Wide Body: 3 "	72	95	7.1	18,000	1,350	10,500	945	0.325	3.130
4 "	58	77	5.7	19,760	1,482	11,527	1,037	0.357	3.436
	21	28	2.1	12,476	956	7,435	669	0.230	2.216
Sub Total	701	927	48.2	103,786	7,805	60,706	5,462	1.886	18.095
<u>Commuter</u>									
Less than 10 seats	-	-	-	-	-	-	-	-	-
10-20 seats	112	148	11	2,220	166	1,377	124	0.042	0.4
25-35 "	12	16	1	440	33	266	24	0.008	0.1
30-45 "	104	137	10	5,137	385	3,200	288	0.099	0.1
45-60 "	16	21	2	1,102	82	677	61	0.021	0.2
Sub Total	244	322	24	8,899	661	5,520	487	0.171	1.70
Total	945	1,247	72.2	112,685	8,471	66,226	5,959	2.057	19.795

TABLE 7.1 PASSENGER FORECASTS FOR YEAR 1995

Fleet Mix	OPERATIONS			SEATS AVAILABLE		PASSENGERS			
	Av. Day January	Av. Day Peak Mo.	Peak hr/ av. day p.m.	Av. day Peak Month	Peak hr/ av. day Peak Month	Av. day/ Peak Month	Peak hour av. day p.m. (L.F.72)	Peak Month (10 ⁶)	Annual (10 ⁶)
Certificated									
Std Body: 2 engine	156	206	15.5	24,800	1860	14,880	1340	0.461	4.435
3 "	121	160	12.	19,200	1,440	11,520	1037	0.357	3.484
4 "	2	3	0.2	400	30	240	22	0.007	0.072
Wide Body: 2 "	107	141	10.6	28,267	2,120	14,940	1526	0.526	5.055
3 "	68	90	6.8	24,133	1,810	14,480	1303	0.449	4.316
4 "	42	55	4.1	26,600	1,995	15,960	1436	0.495	4.757
Sub Total	496	655	49.2	123,400	9,255	74,040	6,644	2.295	22.07
Overwater									
Less than 10 seats	—	—	—	—	—	—	—	—	—
10-20 seats	12	16	1	240	18	144	13	0.004	0.1
25-35 "	—	—	—	—	—	—	—	—	—
30-45 "	188	248	19	9,300	697	5,800	522	0.180	1.7
45-60 "	12	29	2	1,522	114	744	85	0.030	0.3
Sub Total	222	293	22	11,062	829	6,888	620	0.214	2.10
Total	718	948	71.2	134,462	10,084	80,928	7,284	2.509	24.170

TABLE 8.1 PASSENGER FORECASTS FOR YEAR 2000

Fleet Mix	OPERATIONS			SEATS AVAILABLE		PASSENGERS			
	Av. Day	Peak	Peak hr/	Av. day	Peak hr/	Av. day/	Peak hour	Peak	Annual
	January	Mo.	av. day	Peak	Peak Month	Peak Month	av. day	Month	(10 ⁶)
			p.m.				p.m.		(10 ⁵)
<u>Certificated</u>									
Std Body: 2 engine	60	211	15.8	25,280	1,876	15,554	1,403	0.483	4.644
3 "	57	75	5.6	11,427	857	7,044	634	0.218	2.096
4 "	2	3	0.2	413	31	855	23	0.008	0.077
Wide Body: 3 "	140	185	14.0	44,333	3,325	27,333	2,460	0.848	8.154
4 "	74	98	7.3	26,773	2,008	16,511	1,486	0.512	4.923
	54	71	5.3	35,333	2,650	21,789	1,561	0.675	6.490
Sub Total	484	643	48.2	143,540	10,767	88,523	7,967	2.744	26.38
<u>Commuter</u>									
Less than 10 seats	—	—	—	—	—	—	—	—	—
10-20 seats	—	—	—	—	—	—	—	—	—
25-35 "	—	—	—	—	—	—	—	—	—
30-45 "	142	187	15	7,077	562	4,622	416	0.143	1.375
45-60 "	90	119	8	6,237	420	3,455	311	0.107	1.029
Sub Total	232	306	23	13,264	982	8,077	727	0.250	2.40
Total	719	949	71.2	156,804	11,749	96,600	8,694	2.994	28.78

TABLE 9: Total Annual Passengers of MPA, FAA and ATA Forecasts (1,000)


		1980	1985	1990	1995	2000
FAA		15,600	19,800	24,200	NA	NA
MPA	upper bound	17,500	19,800	25,200	28,500	38,700
	lower bound	15,280	17,070	19,790	24,170	28,780
ATA		14,700	20,200	26,200	33,100	41,000

Source: FAA Aviation Forecast of Boston, 3/80
ATA drafted memo, 1/80

	1980 - 2000	
MPA	Av. Annual % Compound Growth Rate	Simple % Increase
UPPER BOUND*	4.6	255
LOWER BOUND	3.1	190

*1980 data is assumed to be 15,280,000 passengers

MASSACHUSETTS PORT AUTHORITY

To: The File
From: Ted Baldwin 
Subject: Calculation of Adjusted Ground Traffic Baseline Growth Rate for BIF Traffic Analysis
Date: March 26, 1981

Purpose: To calculate a growth rate for Logan Airport baseline ground traffic (i.e. No-Build conditions) based on the observed historical relationship between ground traffic and enplaned passengers, and the forecast growth rate for enplaned passengers.

Historical Growth of Ground Traffic:

Total outbound traffic per average weekday

1970	28,198
1979	36,850

Sources: 1970: Coverdale and Colpitts,
Report on Logan Airport Travel Study,
10/31/72, Exhibit J, sheet 7.
(sum of ADT on all outbound links.)

1979: Cambridge Systematics, Inc.,
Logan Airport Master Plan Study - Ground
Traffic and Transportation, materials
presented to Massport Board 4/10/80, p. 18.

Total growth =	31%/9 years
Compound growth rate =	3.0%/year

Historical Growth of Enplaned Passengers:

Source: Massport Aviation Department Air Traffic Statistics

6/70 enplaned passengers	=	426,568
4/79 enplaned passengers	=	642,627

These numbers were adjusted to account for interline passengers, i.e. enplaned passengers who arrived at the airport on another aircraft rather than some ground mode.

6/1970 interline passengers	=	16%
4/1979 interline passengers	=	17%

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Sources: 1970: Coverdale and Colpitts, page 24
1979: Memo from Jeff McMann, CSI, to N. Faramelli
1/25/80, adjusted figures from Table 2 of
Dan Miller, CTPA, memo of 12/21/79 to P.
Sheinfeld.

$$\begin{aligned} 426,568 \times .84 &= 358,317 \\ 642,627 \times .83 &= 533,380 \end{aligned}$$

Total growth = 49%/9 years
Compound growth rate = 4.5%/year

Relationship of Traffic Growth for Enplaned Passengers:

$$\frac{31}{49} = .63 \quad \text{and} \quad \frac{3.0}{4.5} = .67$$

Forecast Enplaned Passenger Growth Rate:

Source: A. Eng Memo 8/26/80

Year Passengers (enplaned and deplaned)

1979	15.2 million
1985	17.1 million
1990	19.8 million
1987	= 1.2 x 1979 (interpolated)

Calculation of Revised Baseline Ground Traffic Growth Rate:

$$.2 \times \frac{31}{49} = .13$$

$$.2 \times \frac{3.0}{4.5} = .13$$

$$1987 \text{ ground traffic} = 1.13 \text{ times } 1979$$

Note:

While the available data are less complete for the P.M. peak hour, comparison of the CSI and Coverdale and Colpitts P.M. peak hour traffic levels indicates substantially less traffic growth than the ADT comparison. The exact reason for this difference is unclear, but it may be a reflection of capacity constraints. Therefore, the ADT growth was used as a measure of unconstrained growth rates. This is the appropriate measure, as we are interested in the estimated growth in traffic demand, not traffic accommodated.

MASSACHUSETTS PORT AUTHORITY

MEMORANDUM

TO: The File

FROM: Ted Baldwin

SUBJECT: Calculation of Air Cargo Car and Truck ADT's and P.M. Peak Hour Trips

DATE: April 9, 1981

For the purposes of the BIF RFEIR, ADT and P.M. peak hour trip generation rates were calculated for automobile and truck trips generated by air cargo development. These generation rates were developed from the results of surveys of air cargo carrier and freight forwarder operations which were conducted by Massport staff in May 1980. These surveys and the observed trucks and cars entering per day per annual ton are discussed in Appendix A of the FEIR/EIS.

Calculation of Truck ADT Rate

Data from Appendix A fo the FEIR/EIS to calculate ADT truck trip generation rates.

	.0066	daily truck movements/annual ton
x.83		annual tons/square foot
	.0055	truck ADT/1000 square feet

Result: 5.5 truck ADT/1000 square foot

Calculation of Automobile ADT

Data are also from Appendix A of FEIR/EIS.

	.0044	daily auto movements/annual ton
x.83		annual tons/square foot
	.0037	auto ADT/square foot

Result 3.7 auto ADT/1000 square foot

Calculation of P.M. Peak Hour Truck Trips Generated

P.M. peak hour truck trips were estimated by applying the percentage of truck trips conducted by the air cargo carriers between 4:00 and 5:00 p.m. as observed during the air cargo survey. Sixteen inbound and 16 outbound movements

MASSACHUSETTS PORT AUTHORITY

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were recorded, out of a daily total of 369 in each direction, for a p.m. peak hour rate of 4.3% of daily movements, or .12 entering and .12 exiting vehicles per 1000 square feet.

Calculation of P.M. Peak Hour Automobile Trips Generated

P.M. peak hour automobile trips were also generated from percentages observed in the survey of air cargo operators. 6.3% (20 out of 320) of all weekday entering trips were observed during the 4:00 to 5:00 p.m. hour, and 12.2% (40 out of 328) of all exiting trips. These factors yield P.M. peak hour trip generation rates per 1000 square feet of .12 entering and .23 exiting vehicles.

Calculation of Mitigated P.M. Peak Hour Automobile Rates

The effects of two mitigating measures were assumed for BIF cargo automobile trips: 10% increase in automobile occupancy (from 1.2 to 1.3 for P.M. peak hour trips and from 1.1 to 1.2 for ADT trips -- auto occupancy is higher during the P.M. peak hour than the average over the entire day), and a 9.1% transit mode split. These measure result in a mitigated ADT rate of 3.1, and P.M. peak hour rates of .10 entering and .19 exiting cars. No mitigation was assumed for cargo trucks.

Summary

The following table summarizes the results of these air cargo ground vehicle trip generation rate calculations:

		RFEIR					
		P.M. Peak Hour					
		ADT		Entering		Exiting	
FEIR		ADT		Unmit.	Mitig.	Unmit.	Mitig.
Cars	3.7	3.7	3.1	.12	.10	.23	.19
Trucks	5.5	5.5	5.5	.12	.12	.12	.12

Ted Baldwin

Ted Baldwin
Aviation Planner

TB/hhg

APPENDIX C - AIR QUALITY ANALYSIS

This section contains a report on 8 hour Carbon Monoxide (CO) levels in 1987 done by our air quality consultant (Appendix C-1). Also included are memos from the traffic engineers that set forth the traffic analysis (including queuing characteristics) used in the air quality report (Appendix C-2).

APPENDIX C-1 - Consultant's Air Quality
Report



Report No. 4659

EIGHT-HOUR CARBON MONOXIDE IMPACT ANALYSIS OF THE
PROPOSED BIRD ISLAND FLATS DEVELOPMENT IN 1987

K.M. Chng
M.J. Thorpe
W.F. Cote

April 1981

Prepared by:

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Prepared for:

Massachusetts Port Authority
Boston, MA

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1. INTRODUCTION

The objective of this study is to assess the potential air quality impact of the proposed Bird Island Flats Project at Logan Airport in East Boston, Massachusetts. Specifically, the impact assessment is limited to an 8-hr carbon monoxide (CO) analysis. This study is designed as a supplement to the extensive air quality analysis that was conducted in conjunction with the Draft and the Final EIR/EIS for the Bird Island Flats Project. The scope and approach to this 8-hr CO analysis was developed and agreed upon by the U.S. Environmental Protection Agency Region I office, the Massachusetts Department of Environmental Quality Engineering, and the Massachusetts Executive Office of Environmental Affairs. The year selected for analysis is 1987.

Section 2 of this report describes the analysis methods and input data. The results of the modeling analysis are given in Section 3.

2. AIR QUALITY ANALYSIS METHODS AND INPUT DATA

To assess the air quality impact, emissions of carbon monoxide (CO) from all motor vehicles, aircraft, and ground support service vehicles in the entire Airport, and motor vehicle services, the Sumner Tunnel portal, and on Route C-1 were estimated for an eight-hr period. From these emissions, the maximum ambient eight-hr CO concentrations at selected receptor locations at Logan Airport and its vicinity were estimated. These concentrations were then compared with the applicable measurements and federal eight-hr CO standard. The modeling techniques and the input data used to estimate the emissions and the resulting concentrations are described in this section.

Estimating Emissions

Automobile Sources

To estimate emissions from automobile sources, emission factors as compiled in EPA's *Mobile Source Emission Factors* document [1] were used. The computation procedures were implemented by the use of a computer program from EPA's Office of Transportation and Land Use Policy [2].

To make these emission factors more specific to the analysis of this project, a number of correction factors were applied as follows.

Vehicle Registration Data

Vehicle registration data for the light-duty vehicle class (comprising all of the private passenger automobiles) showing distribution of the vehicle population by age, as used by the

EPA procedure, were replaced by registration data that pertained to Massachusetts. These data were provided by the Massachusetts Department of Environmental Quality Engineering (DEQE) and are shown in Table 1 along with national registration data for the other vehicle classes. The Massachusetts data show that the automobile population is generally "older" compared with the national average (about 45% of the automobiles in Massachusetts are five years old or less vs 50% for the national average).

Distribution of Vehicle-Miles-Traveled (VMT) According to Vehicle Category

The distribution of the VMT used to develop a composite emission factor was based on 1979 vehicle classification counts at six locations at and around Logan provided by Massport [3]. On the main airport loop and individual terminal approaches, the VMT distribution consists of 86.1% automobiles, 10.2% light-duty trucks, 2.2% heavy-duty gasoline trucks, and 1.5% heavy-duty diesel trucks. For parking areas and employee access of cargo areas, 100% automobiles are assumed. For all future cargo and food preparation truck assessments, the VMT distribution is assumed to be 73% light-duty trucks, 16.2% heavy-duty gasoline trucks, and 10.8% heavy-duty diesel trucks. For traffic on Route C-1 and at the Tunnel portal, the distribution of the VMT that was used to develop a composite emission factor consisted of 80.3% automobiles, 11.6% light-duty trucks, 4.5% heavy-duty gasoline trucks, 3.1% heavy-duty diesel trucks, and 0.5% motorcycles.

Mix of Cold, Stabilized, and Hot Transient Operations

Automobile exhaust emission rates are influenced by the temperature of the engine. A vehicle operated in the cold

TABLE 1. THE FRACTION OF TOTAL VEHICLE REGISTRATION FOR DIFFERENT VEHICLE CATEGORIES DISTRIBUTED BY AGE OF VEHICLES.

Age of Vehicles (years)	Light-Duty Vehicles	Light-Duty Trucks <6000 lbs	Light-Duty Trucks 6000-8500 lbs	Heavy-Duty Gasoline	Heavy-Duty Diesel	Motorcycle
1	0.072	0.061	0.037	0.037	0.077	0.105
2	0.089	0.095	0.070	0.070	0.135	0.225
3	0.078	0.094	0.078	0.078	0.134	0.206
4	0.102	0.103	0.086	0.086	0.131	0.149
5	0.113	0.083	0.075	0.075	0.099	0.097
6	0.104	0.076	0.075	0.075	0.090	0.062
7	0.089	0.076	0.075	0.075	0.082	0.046
8	0.086	0.063	0.068	0.068	0.062	0.033
9	0.072	0.054	0.059	0.059	0.045	0.029
10	0.063	0.043	0.053	0.053	0.033	0.023
11	0.043	0.036	0.044	0.044	0.025	0.008
12	0.034	0.024	0.032	0.032	0.015	0.005
13	0.023	0.030	0.038	0.038	0.013	0.013
14	0.013	0.028	0.036	0.036	0.011	0.000
15	0.007	0.026	0.034	0.034	0.010	0.000
16	0.004	0.024	0.032	0.032	0.008	0.000
17	0.002	0.022	0.030	0.030	0.007	0.000
18	0.002	0.020	0.028	0.028	0.006	0.000
19	0.002	0.018	0.026	0.026	0.005	0.000
20	0.001	0.016	0.024	0.024	0.004	0.000

phase, for example, will have higher emission rates of CO than if the same vehicle were operated in a stabilized phase. The Federal Test Procedure (FTP) mix of 21% cold, 27% hot transient, and 52% stabilized was used in this analysis for the eight-hr period.

Ambient Temperature

Emission rates of CO decrease with increasing ambient temperatures. The FTP data were taken over a range of temperatures from 68°F to 86°F. There is a basis in the model for adjusting to the temperatures that are applicable in the specific situation. For this particular analysis, an ambient temperature of 35°F was used.

Traffic Volume

Traffic volumes are a direct measure of activity and are multiplied by the emission factors and by the length of the road segment to obtain the emission results. Traffic data were developed by Vanasse/Hangen Engineering, Inc. [4]. These data were compiled for the existing conditions and were estimated for the analysis year 1987, for the Revised No-Build, the Proposed Development Plan*, and the Revised Proposed Development Plan. Figure 1 shows the locations of the stations at the various Airport roadway systems for which estimated traffic volumes were developed, and Table 2 shows the volumes at each of these stations for the existing and the 1987 cars.

Vehicle Speeds

Emissions vary with speed. The FTP compiles emission data at three average vehicle speeds corresponding to the three

*FEIR

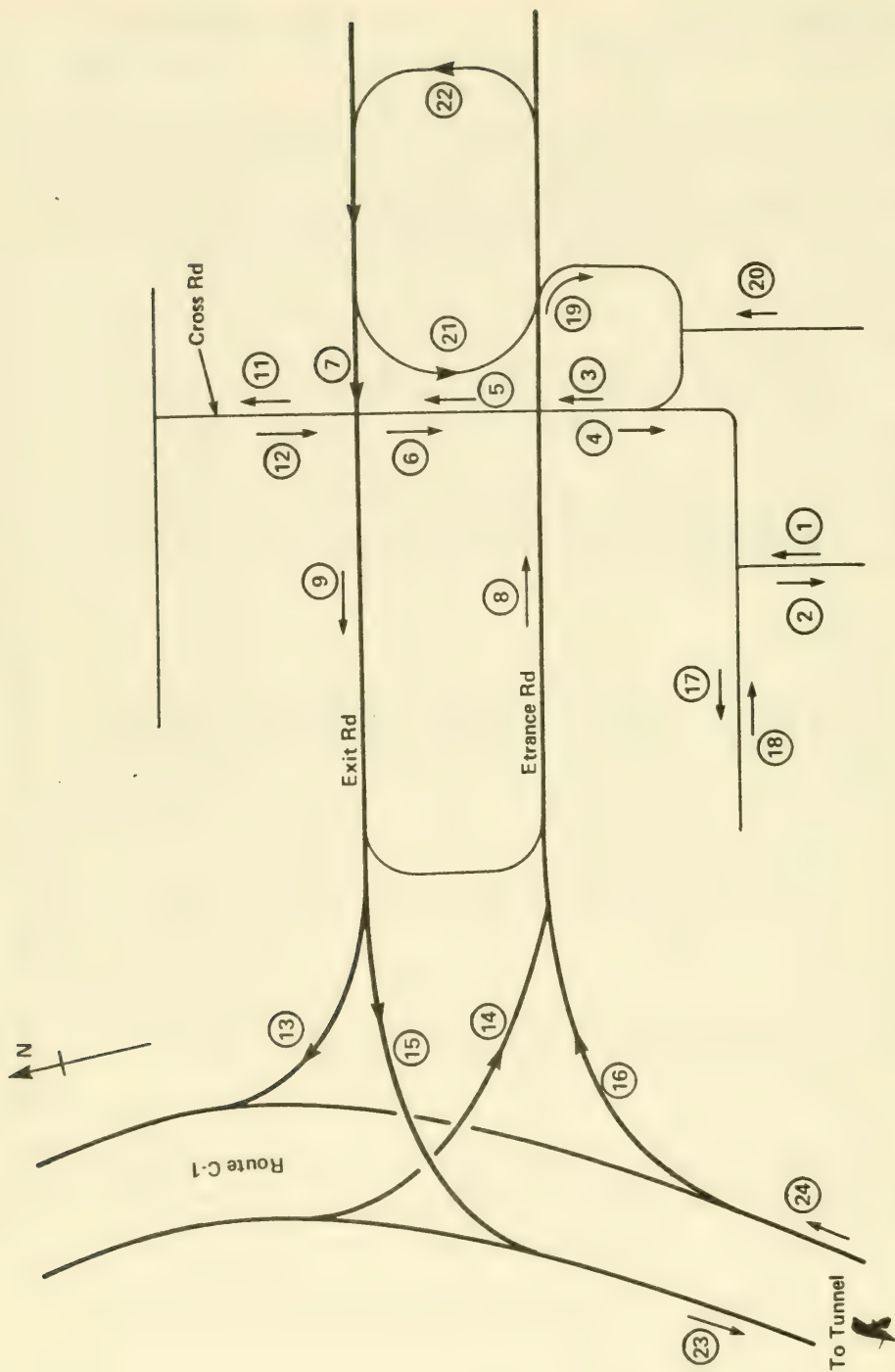


FIG. 1. LOGAN AIRPORT ROADWAYS SHOWING STATIONS WHERE TRAFFIC VOLUMES WERE ESTIMATED.

TABLE 2

EIGHT-HR TRAFFIC VOLUMES AT LOGAN AIRPORT FOR EXISTING AND 1987 CONDITIONS

Location ID No.*	1981	1987		
	Existing Conditions	Revised No-Build	Proposed Development Plan**	Revised Proposed Development Plan**
1	1540	1730	1650	1650
2	1540	1730	1650	1650
3	1980	2230	3050	3050
4	2350	2650	2500	2500
5	3290	3700	3540	3540
6	4275	4815	1090	1090
7	11590	13050	15832	13705
8	13510	15215	17500	16940
9	11540	13000	19330	16960
11	1935	2180	2150	2150
12	1820	2050	2040	2040
13	3745	4220	6120	5020
14	3770	4245	5370	5070
15	7415	8350	9750	9080
16	9360	10540	11090	10500
17	2235	2520	2500	2500
18	2235	2520	2500	2500
19	0	0	3650	2500
20	0	0	3810	2070
21	0	0		
22	0	0	3810	2070
23	17810	20060	22865	21138
24	19215	21640	22280	21960

* Station locations are as shown in Fig. 1

**The traffic assignments for the Proposed Development Plan and the Revised Proposed Development Plan are based on a set of mitigation measures and roadway improvements as described in the text.

phases of engine operation (cold, stabilized, and hot transient). The weighted average speed for the whole cycle is about 21 mph. At speeds other than 21 mph, the FTP provides for adjustments. Generally, at higher speeds, CO emission rates decrease. For the eight-hr averaging time, vehicle speeds on all roadways were assumed to be 35 mph. These are free-flow speeds and do not apply at intersections or at the tunnel portals.

Intersection Data

Estimates of emission rates at the two intersections on the Cross Road were achieved using procedures contained in EPA's Volume 9 for Evaluating Indirect Sources [5]. The demand volumes and approach capacities for the existing roadway configuration (i.e., without signal cycle changes and roadway improvements) for the various project alternatives are as shown in Table 3. With the proposed changes in roadways and demand volumes, the capacities were also changed to minimize potential congestion or queuing. The new volumes and capacities are exhibited in Table 4.

The signal phasing and associated green times for the Exit Road/Cross Road and the Entrance Road/Cross Road intersections are given in Figure 2. Total cycle time was unchanged at 115 seconds.

TABLE 3. INTERSECTION APPROACH CAPACITIES AND PM PEAK HOUR DEMAND VOLUMES IN 1987 - EXISTING ROADWAY CONDITIONS

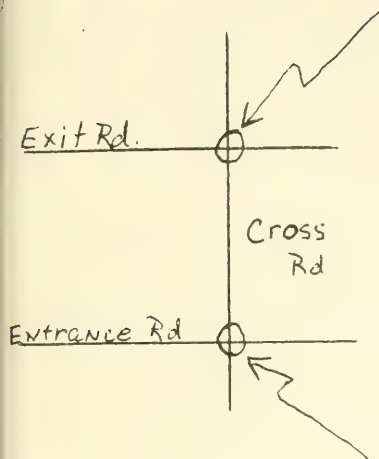
	ALTERNATIVES			
	Capacity*	Revised No Build	Proposed Development Plan	Revised PDP
Exit Road/Cross Road				
Exit Road W. Bound	1775	2250	2250	2250
Cross Road S. Bound	850	340	407	
Cross Road N. Bound				
- Through	1050	165	165	165
- Left Turn	216	320	861	
Entrance/Cross Road				
Entrance Road-E. Bound	1812	2090	2090	2090
-Right Turn	516	265	502	
Cross Road - S. Bound				
-Through	960	290	362	
-Left Turn	312	430	430	430
Cross Road - N. Bound	387	465	1091	

Capacities are in vehicles per hour.

TABLE 4. INTERSECTION APPROACH CAPACITIES AND PM PEAK HOUR DEMAND VOLUMES IN 1987 - MITIGATED CONDITIONS

	ALTERNATIVES			
	Capacity*	Revised No Build	Proposed Development Plan	Revised PDP
Exit Road/Cross Road				
Exit Road W. Bound	2612	1885	2732	2365
Cross Road S. Bound	328	326	326	326
Cross Road N. Bound				
- Through	158	158	158	158
- Left Turn	200	306	306	306
Entrance/Cross Road				
Entrance Road E. Bound				
- Through	2107	2000	2226	2160
- Right Turn	600	479	460	460
Cross Road S. Bound				
- Through	903	63	63	63
- Left Turn	120	100	100	100
Cross Road N. Bound	580	636	636	636

Capacities are in vehicles per hour.



Phase A	B	C
 $G_T^* = 50 \text{ sec}$ $= [71 \text{ sec}]$	 $G_T = 30 \text{ sec}$ $= [12 \text{ sec}]$	 $G_T = 21 \text{ sec}$ $= [17 \text{ sec}]$
Phase A	B	C
 $G_T = 50 \text{ sec}$ $= [58 \text{ sec}]$	 $G_T = 30 \text{ sec}$ $= [12 \text{ sec}]$	 $G_T = 21 \text{ sec}$ $= [31 \text{ sec}]$

* G_T denotes green time in seconds. The unbracketed numbers refer to existing conditions, and the bracketed numbers to the mitigated conditions. Total cycle time in both cases is 115 seconds.

FIG. 2. SIGNAL CYCLE TIMES AT THE TWO INTERSECTIONS FOR EXISTING AND PROPOSED MITIGATED CONDITIONS.

Queuing Data for the Sumner Tunnel

Demand volumes for both the Sumner and the Callahan Tunnels for existing conditions and for the No-Build, Proposed Development Plan (FEIR), and the Revised Proposed Development Plan in 1987 are as shown in Table 5. These data were developed by Vanasse/Hangen Engineering, Inc., and provide data on an hourly basis for the 8-hr period from noon to 8 pm.

For the purpose of the air quality analysis three different sets of tunnel congestions scenarios were selected. The first is associated with a "free-flow" condition. Under this condition, queues at the Sumner Tunnel portal are minimal. Queue length and average delay times were estimated based on empirically derived toll-booth processing times, and vehicle arrival rates at the booth. These processing times were disaggregated between "manual operated" and "exact change" booths, and individual accounting of all seven individual booths was used. Details of the queuing analysis under free flow conditions are provided in a technical memorandum from Vanasse/Hangen Engineering, Inc. dated March 17, 1981.

The second set of conditions are referred to as the worst congestion scenario. This condition will come about when the demand for the Sumner Tunnel exceeds the limiting capacity at the Boston end of the tunnel. Discharge capacities at the toll booth is no longer the limiting factor. Under this condition queues under the Proposed Development Plan (FEIR) were estimated to reach 900 vehicles during 5-6 pm, and average delay during this hour was estimated at about 22 minutes. Under the maximum congestion scenarios, long queues and long delays were estimated to last from 3 pm to 8 pm. The queue lengths and delay times for the Revised No-Build, the Proposed Development Plan (FEIR), and the Revised PDP are set forth in Table 6. As noted in the table, the delay times of the Revised PDP are substantially reduced.

TABLE 5. DEMAND VOLUMES FOR THE SUMNER AND THE CALLAHAN TUNNELS FOR EXISTING AND 1987 CONDITIONS.

Hour	1981	Revised No-Build	1987	Revised PDP
	Existing		Proposed Development Plan	
Sumner (In-Bound)				
12-1	2041	2250	2510	2480
1-2	1910	2110	2250	2220
2-3	2360	2600	2720	2680
3-4	2541	3160	3340	3260
4-5	2241	2590	3000	2860
5-6	2255	2580	2800	2810
6-7	2347	2760	2860	2820
7-8	2117	2910	2970	2930
Callahan (Out-Bound)				
12-1	2266	2500	2770	2690
1-2	2180	2400	2640	2570
2-3	2344	2590	2770	2720
3-4	2643	2920	3020	2990
4-5	2695	2970	3100	3050
5-6	2605	2870	2950	2930
6-7	2270	2500	2580	2560
7-8	2209	2440	2450	2450

TABLE 6. SUMNER TUNNEL 1987 8-HR QUEUING IMPACT PARAMETERS USED IN THE CO IMPACT ANALYSIS

Hour	Revised No-Build			Proposed Development Plan			Revised Proposed Development Plan		
	Demand Volume*	Queue Length*	Average Delay*	Demand Volume	Queue Length	Average Delay	Demand Volume	Queue Length	Average Delay
12-1pm	2250	---	---	2510	---	---	2480	---	---
1-2	2110	-	-	2250	-	-	2220	-	-
2-3	2600	-	-	2720	-	-	2680	-	-
3-4	3164	45	1	3340	70	2	3257	55	1
4-5	2592	130	3	3000	380	9	2857	265	6
5-6	2582	210	5	2880	920	22	2808	600	14
6-7	2756	140	3	2860	890	22	2818	430	10
7-8	2912	115	3	2970	490	12	2928	140	3

*Demand volumes are in vehicles per hour, queue length is the average number of total vehicles in the hour, and average delay is in minutes per vehicle.

**The numbers 12 noon to 3 pm were treated as "free-flow" conditions; consequently the queue length and average delay were estimated by a different algorithm as described in the test.

The final set of tunnel congestion scenario analyzed is referred to as the 3-7 pm congestion. This set of conditions is very similar to the worst congestion case, except that the congestion from 7 to 8 pm is no longer applicable. Instead, queue length and delay times for the last hour are controlled by the toll booth discharge rate and the vehicle arrival rate again. This condition is experienced on a typical congested day.

Aircraft Sources

The procedures for estimating aircraft emissions were based on the Northern Research and Engineering Corporation AIREC model [6]. This procedure and the associated input used to model the Logan fleet mix and activity were described in detail in Volume 2 of the FEIR [7] and are therefore not duplicated here.

Ground Support Service Vehicles

The procedures for estimating emissions from ground support service vehicles were based on Argonne's AVAP model [8] except that the equipment mix and service times were made more specific to the Logan Airport application. Volume 2 of the FEIR also describes this procedure and associated input in some detail.

Diffusion Modeling Analysis

After the CO emissions are discharged into the atmosphere by the various emission sources, the CO is transported by the prevailing wind and diluted through dispersion by atmospheric turbulence. The resulting CO concentration at any location in the study area is dictated by the rate of emission of the CO sources, the spatial distribution of the emission sources, and meteorological variables.

Two diffusion models were used to estimate ambient CO concentrations. The AIREC model was used to determine ambient CO concentration from aircraft sources, while the EPA PAL model [9] was used to estimate ambient concentrations from both motor vehicle and ground support service vehicle sources.

Emission Rates

Emission rates for automobile sources were specified as emissions of CO per unit time per unit length of roadway. The emission rates on a given road segment in the vicinity of an intersection were accounted for as a two-component variable. The first is the free-flow or cruise emission rate. This rate was obtained by multiplying the free-flow emission factor by the traffic volume in the time interval in question.

The second component is called the excess emission rate and is made up of emissions from vehicles idling in a queue and waiting for a traffic light or at a stop sign and from decelerating and accelerating vehicles coming into and out of the queue. Emissions from idling vehicles in a queue at an intersection are estimated based on EPA's *Indirect Source Guidelines* [5] and as updated in EPA's *CO Hot-Spot Guidelines* [10]. Emissions from vehicles decelerating and accelerating are also estimated according to EPA's *Hot-Spot Guidelines* document. The algorithm is based on EPA's *Modal Model* [11]. The emissions are a function of terminal vehicle free-flow speed and the rate of acceleration or deceleration. For this application, we followed the *Guideline's* assumption of 2.5 mph/sec.

For aircraft sources, the emission rates associated with the various aircraft operating modes are computed "internally"

in the AIREC program. These rates and their associated spatial distribution are then used by the diffusion portion of the AIREC model to estimate concentration.

Emissions from ground support service vehicles were specified in terms of an area source emission rate and input into the PAL model.

Spatial Distribution of Emission Sources and Receptor Locations

Layouts of the roads for the existing conditions and the future cases were used to determine location of the line sources that represent the emission sources from the automobiles. These layouts were also used to select receptor locations and to develop a common coordinate system by which emission sources and receptor locations could be input into the diffusion model mathematically. The location at which ambient concentrations are monitored or for which they are estimated as known as receptors. In general, receptors are simulated locations assigned to reflect the points where maximum total estimated concentrations are likely to occur and where the general public is likely to have access over a time period that corresponds to the averaging time specified by the applicable eight-hr CO standard. The receptors that were selected for this analysis include those that were identified in the FEIR as showing a potential for relatively high CO concentrations. Additionally, a new receptor located at a residence on Havre St. in the immediate vicinity of the Tunnel portal was introduced to monitor the maximum impact from the tunnel congestion. The receptor locations are shown in Fig. 3.

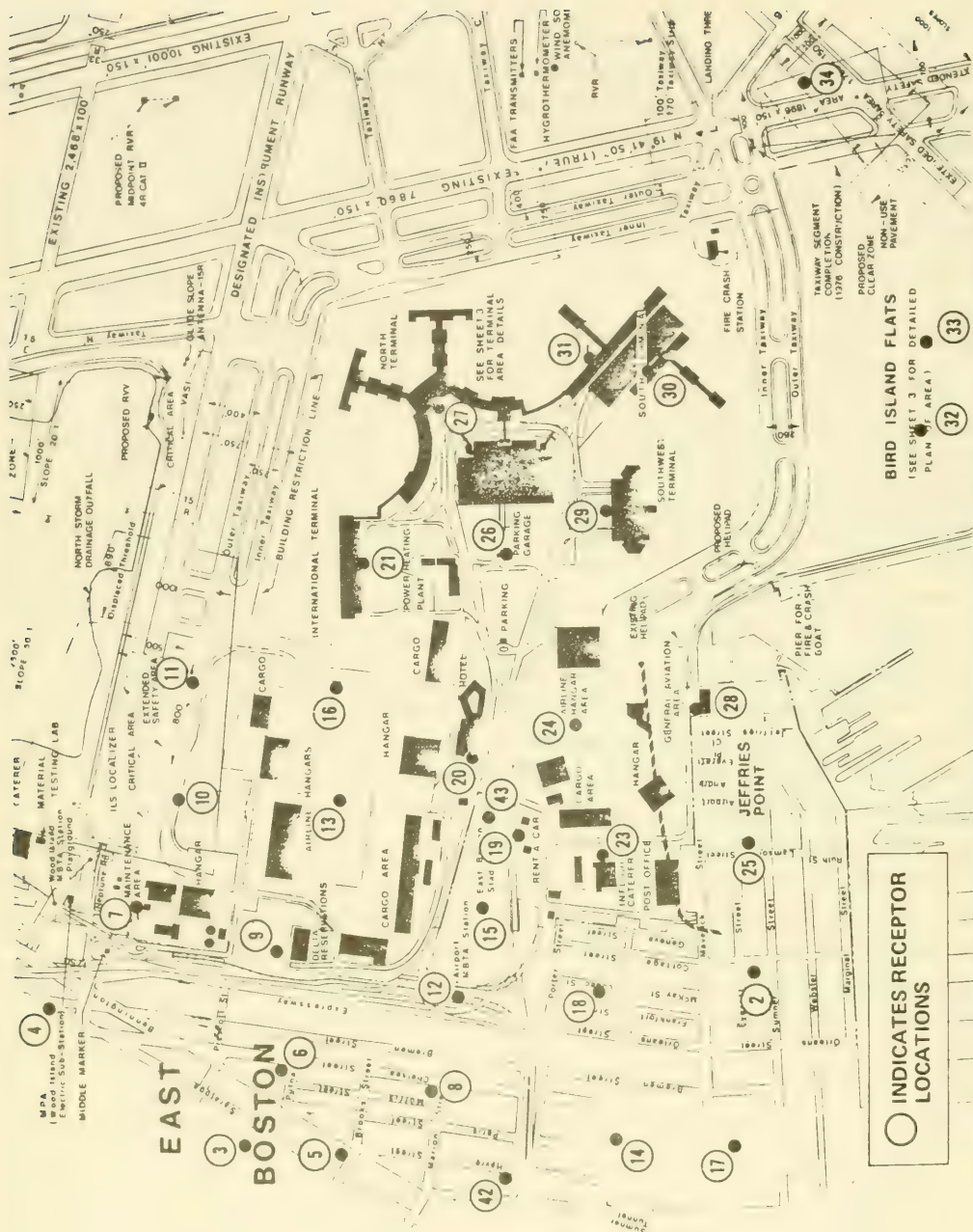


FIGURE 3. LOGAN AIRPORT AND VICINITY, SHOWING LOCATIONS OF THE RECEPTORS USED IN THE 8-HR CO ANALYSIS. DESCRIPTION OF LOCATIONS IS GIVEN IN TABLE 7.

Meteorological Variables

The primary variables affecting the dispersion of CO are wind speed and direction, atmospheric stability, and the vertical thickness of the mixing layer.

The prevailing wind will dictate the general direction of movement of the CO emissions. High wind speed will promote transport and result in low ambient CO concentrations. To estimate potentially worst situations, a low wind speed of 1 m/sec was used in the modeling analysis.

The stability of the atmosphere affects the dispersion or the mixing rate of CO (in an exhaust plume, for example) with the ambient air. This stability is determined by the vertical temperature gradient of the atmosphere. An unstable atmosphere will promote both vertical and horizontal mixing leading to lower concentrations. Conversely, a stable atmosphere will result in higher ambient concentrations. In the modeling analysis for Bird Island Flats, a stable atmosphere (corresponding to a Pasquill classification of D stability) was assumed. This assumption is believed to be quite appropriate for an urban setting.

Another meteorology parameter affecting ambient concentrations is the vertical thickness of the mixing layer, also referred to as the mixing height. Higher mixing heights will result in a larger volume of air made available for dilution, resulting in lower ground level ambient concentrations. A review of mixing height data compiled for the Boston area [12] indicated that the average mixing height for the morning is 400 meters and for the afternoon is 1400 meters. To reflect more severe, although less frequent, conditions associated with

level temperature inversion, a mixing height of 50 meters was assumed in the modeling analysis.

The modeling predictions of maximum eight-hr CO concentrations include an assumed background level of 3.4 milligrams per cubic meter (or 3 parts per million) for the 1981 case. This background level was selected following discussions with EPA and DEQE. Background levels are allowed to decrease for future analysis years in direct proportion to the decreases in automobile emission factors.

3. IMPACT ON CARBON MONOXIDE CONCENTRATIONS

CO concentrations at selected receptor locations at Logan Airport and adjoining East Boston communities were estimated using modeling procedures that are described in Sec. 2. These concentrations were then compared with the federal and Massachusetts standard of 10 milligrams per cubic meter (mg/m^3).

The results of the modeling estimates of ambient CO concentrations for the existing (1981) eight-hr conditions are shown in Table 7. The analysis was performed for three different sets of congestion situations at the Sumner Tunnel. Under the "free-flow" scenario at the Tunnel, exceedance of the eight-hr CO standard was estimated for three out of the thirteen receptor locations examined. Maximum concentrations for a receptor located at the Playground (Receptor 15) was estimated at $12.7 \text{ mg}/\text{m}^3$, which is 29% over the corresponding standard. For a receptor located at the Hilton Hotel (Receptor 20), maximum eight-hr CO concentration was estimated at $15.6 \text{ mg}/\text{m}^3$, which is also well over the standard. The maximum concentration for a receptor located at the tennis court was estimated at $14.0 \text{ mg}/\text{m}^3$. These three locations represent the areas where CO impact is more severe.

Under a maximum congestion scenario at the Tunnel, maximum eight-hr CO concentration at the Hilton Hotel was estimated to increase to $16.4 \text{ mg}/\text{m}^3$ when compared with the corresponding estimates for the free-flow case. As anticipated, maximum eight-hr CO concentration of tunnel portal (as reflected in the results for Receptor 42) has increased significantly from 7.8 to $15.4 \text{ mg}/\text{m}^3$. Under the maximum congestion scenario, the number of receptor locations showing exceedance of the eight-hr standard has increased to five.

TABLE 7. MODELING PREDICTIONS OF CARBON MONOXIDE CONCENTRATIONS* AT SELECTED RECEPTOR LOCATIONS AT LOGAN AIRPORT AND VICINITY UNDER EXISTING (1981) CONDITIONS, FOR EIGHT-HR AVERAGING TIME UNDER VARIOUS TUNNEL CONGESTION SCENARIOS.

Receptor ID	Description	Free-Flow	Maximum Congestion	3-7p.m. Congestion
42	Residence on Havre St.	7.8	15.4	13.7
14	Residence on Gove St.	7.0	8.8	8.5
15	Playground	12.7	12.7	12.7
28	Van Dusen Bldg. at Jeff. Pt.	6.1	6.1	6.1
4	Neptune Road Area	5.5	5.5	5.5
12	MBTA Station	7.9	7.9	7.9
20	Hilton Hotel	15.6	16.4	16.2
36	BIF near Jeffries Pt.	4.6	4.7	4.7
32	BIF Proper	4.4	4.4	4.4
29	EAL Terminal	6.1	6.3	6.3
31	SW Terminal	8.8	8.8	8.8
9	North Apron	9.7	10.5	10.3
43	Tennis Court	14.0	14.0	14.0

*Concentrations are given in milligrams per cubic meter (mg/m^3).
The eight-hr standard is $10 \text{ mg}/\text{m}^3$.

The third tunnel scenario that was modeled is referred to as the "3 - 7 p.m. congestion." This condition is similar to the maximum congestion case, except that the long queues estimated for the 7 to 8 p.m. are assumed to be no longer applicable. Under this set of conditions, maximum 8-hr concentrations estimated for the receptors located at Havre St. and at the Hilton Hotel are respectively, 13.7 and 16.2 mg/m³. These concentrations are still over the standard.

Estimated ambient CO concentrations for all alternatives examined, exhibit dramatic decreases with time such that by 1987, estimated maximum CO concentrations generally range from 60% to 71% of their corresponding 1981 estimates. This overall decrease in CO concentrations is attributed to both the effects of the Federal Motor Vehicle Control Program (FMVCP) which mandates very stringent emissions limitations on exhaust emissions from motor vehicles and the proposed Inspection/Maintenance (I/M) Program.

Table 8 shows the estimated 1987 eight-hr CO concentrations for the Revised No-Build, the Proposed Development Plan (FEIR) and the Revised Proposed Development alternatives under a free-flow scenario at the Tunnel. With the exception of the receptors located at the Hilton Hotel and at the tennis court, no exceedance of the eight-hr standard is found anywhere. Under the Revised No-Build alternative, the maximum eight-hr CO concentration at the Hilton was estimated at about 11.1 mg/m³. With the mitigated Proposed Development Plan (FEIR) this concentration is expected to decrease to 10.8 mg/m³. With the mitigated Revised Proposed Development, the maximum eight-hr concentration at this receptor is expected to decrease even more. The mitigation measures that

TABLE 8

MODELING PREDICTIONS OF CARBON MONOXIDE CONCENTRATIONS AT SELECTED RECEPTOR LOCATIONS AT LOGAN AIRPORT AND VICINITY FOR 1987, EIGHT-HR AVERAGING TIME UNDER A FREE FLOW SCENARIO AT THE TUNNEL.

Receptor ID	Description	Alternatives		
		Revised No-Build	Proposed Development	Revised Proposed Development
42	Residence on Havre St.	4.7	5.4	5.3
14	Residence on Gove St.	4.2	4.5	4.3
15	Playground	9.0	9.8	9.6
28	Van Dusen Bldg. at Jeff. Pt.	3.8	4.5	4.3
4	Neptune Road Area	3.4	3.8	3.6
12	MBTA Station	4.5	5.2	4.6
20	Hilton Hotel	11.1	10.8	10.5
36	BIF near Jeffries Pt.	2.8	3.2	3.2
32	BIF Proper	2.8	3.8	3.7
29	EAL Terminal	4.1	4.4	4.3
31	SW Terminal	6.4	6.6	6.4
9	North Apron	5.9	6.5	6.2
43	Tennis Court	10.1	10.7	10.5

were explored and incorporated into the modeling analysis of impact from the two build alternatives include both roadway and traffic circulation modifications, and proposed incentive measures to increase car occupancy and transit ridership. The roadway improvements include the proposed construction of a "jug handle" to allow entering vehicles (to the Airport) to go northbound on the cross road without making a left turn at the intersection. These improvements are also expected to create two U-turns to promote the circulation of the added traffic from BIF on the entrance and exit roads. To accommodate these traffic volume changes and turn movements, traffic signal cycles were modified to change capacities to meet changing traffic demand.

The receptor located at the tennis court was also selected to identify concentrations near the intersection. Under the Revised No-Build configuration, the concentration is estimated at 10.1 mg/m^3 . The Proposed Development Plan (FEIR) shows a slight increase at this site and the estimated concentration is 10.7 mg/m^3 . Under the Revised Proposed Development, the estimated concentration is 10.5 mg/m^3 . The estimated concentrations at this point are influenced by vehicular emissions at the Cross Road, northbound, leading into the Entrance Road. The eight-hour traffic volumes on this road are represented by site number three, and are listed in Table 2. The difference in traffic volumes represents an increase of about 35 percent from the Revised No-Build to the proposed Development Plan (FEIR). Because of the improvements in traffic flow due to the mitigation measures, the difference in the resultant concentrations is minimized.

The effects of the roadway improvement and attendant traffic modification on predicted ambient CO concentrations for the

Proposed Development Plan (FEIR) are illustrated in Table 9. For receptors that are located near the intersections, decreases in CO concentrations with the roadway improvement were estimated to range from about 6 to 19%. Greatest decrease in CO was found at the tennis courts due to roadway improvements. By its proximity to the cross road, the predicted decrease in concentration reflects the significant reduction of traffic on the cross road associated with the proposed new roadway system. For a receptor farther away (for example, at Havre St.), the impact of the roadway improvement - in terms of absolute changes in total CO concentrations - is hardly noticeable.

When congestion at the Tunnel becomes more serious - for example, under the maximum (the 3 - 8 p.m.) or the 3 - 7 p.m. congestion scenarios - estimated CO concentrations at all receptors with the exception of the tennis court, show an increase. As expected, increases at the Tunnel area are quite high - about 6 mg/m³ under the Proposed Development Plan (FEIR). For the receptor located at Havre St., the maximum eight-hr CO concentration under the Proposed Development Plan (FEIR) was estimated at 11.8 mg/m³, which is about 2.5 mg/m³ higher than the 9.3 mg/m³ estimated for the Alternative. As shown in Table 10, the estimated eight-hr CO concentration associated with the Revised Proposed Development Plan at this location is 10.7 mg/m³, which is about 1.4 mg/m³ higher than the corresponding No-Build estimate. At the Hilton Hotel, the Proposed Development (FEIR) was estimated to result in an increase of 0.2 mg/m³ over the corresponding eight-hr CO concentration under the No-Build Alternative. But with the Revised Proposed Development Plan, the 11.5 mg/m³ associated with the No-Build Alternative, was estimated to decrease to 11.2 mg/m³. Table 11 exhibits a similar set of results for the case

TABLE 9.

EFFECTS OF ROADWAY IMPROVEMENT MEASURES ON ESTIMATED MAXIMUM EIGHT-HR CO CONCENTRATIONS*

Receptor ID	Description	Existing Roadway	Roadway Improvement	Change Over Existing Roadway
15	Playground	8.5**	8.0	-0.5
20	Hilton Hotel	12.3	11.3	-1.0
43	Tennis Court	13.3	10.7	-2.6
42	Havre St. @ Tunnel			

*Based on Proposed Development traffic volumes in 1987. Only contributions from motor vehicle emissions on the two intersections at the Cross Road and at Airport roadways were used in these estimates.

**Concentrations are in milligrams per cubic meter (mg/m^3).

TABLE 10

MODELING PREDICTIONS OF CARBON MONOXIDE CONCENTRATIONS AT SELECTED RECEPTOR LOCATIONS AT LOGAN AIRPORT AND VICINITY FOR 1987, EIGHT-HR AVERAGING TIME UNDER A MAXIMUM CONGESTION SCENARIO AT THE TUNNEL.

Receptor ID	Description	Alternatives		
		Revised No-Build	Proposed Development	Revised Proposed Development
42	Residence on Havre St.	9.3	11.8	10.7
14	Residence on Gove St.	5.3	7.4	6.4
15	Playground	9.0	9.8	9.6
28	Van Dusen Bldg. at Jeff. Pt.	3.8	5.4	4.7
4	Neptune Road Area	3.4	5.2	4.1
12	MBTA Station	5.0	9.0	7.7
20	Hilton Hotel	11.5	11.7	11.2
36	BIF near Jeffries Pt.	2.8	3.4	3.2
32	BIF Proper	2.8	4.2	3.9
29	EAL Terminal	4.3	4.9	4.7
31	SW Terminal	6.5	7.2	6.8
9	North Apron	6.5	8.6	7.1
43	Tennis Court	10.1	10.7	10.5

TABLE 11

MODELING PREDICTIONS OF CARBON MONOXIDE CONCENTRATIONS AT SELECTED RECEPTOR LOCATIONS AT LOGAN AIRPORT AND VICINITY FOR 1987, EIGHT-HR AVERAGING TIME UNDER A 3 - 7 p.m. CONGESTION SCENARIO AT THE TUNNEL.

Receptor ID	Description	Alternatives		
		Revised No-Build	Proposed Development	Revised Proposed Development
42	Residence on Havre St.	8.3	10.3	9.5
14	Residence on Gove St.	5.1	6.7	6.1
15	Playground	9.0	9.8	9.6
28	Van Dusen Bldg. at Jeff. Pt.	3.8	5.2	4.7
4	Neptune Road Area	3.4	5.0	4.1
12	MBTA Station	5.0	8.3	7.3
20	Hilton Hotel	11.4	11.5	11.1
36	BIF near Jeffries Pt.	2.8	3.3	3.2
32	BIF Proper	2.8	4.1	3.9
29	EAL Terminal	4.3	4.8	4.7
31	SW Terminal	6.5	7.1	6.7
9	North Apron	6.3	8.2	7.0
43	Tennis Court	10.1	10.7	10.5

with the 3 - 7 p.m. congestion scenario at the Tunnel. The trends between alternatives are similar to the maximum congestion case, except that the differential impacts are not as high as the maximum congestion case.

Consistency with the Massachusetts State Implementation Plan (SIP)

The SIP consistency criterion with respect to CO requires a demonstration that (1) the proposed project (or the preferred alternative) will not result in CO standard violation in areas where violations presently do not exist, and (2) CO concentrations with the preferred alternative will decrease in areas where violations do presently exist. The criterion reflects the need to initiate progress by the state toward the attainment and maintenance of the CO standard by the federally sanctioned deadline of 1987.

Based on the modeling results presented above, the proposed BIF development is not expected to result in creating new violations in areas where violations do not presently exist. For a receptor located at the Hilton Hotel, exceedance of the 10 mg/m^3 standard was predicted for all alternatives under the three tunnel congestion scenarios examined. However, with the Revised PDP, the maximum eight-hr CO at this receptor is less than the corresponding estimates under the Revised No-Build. For almost all of the receptors examined, therefore, the Revised PDP was found to be consistent with Massachusetts SIP criterion for CO.

Under the free-flow and the 3- 7 p.m. congestion scenarios at the Tunnel, the Revised PDP was estimated to result in maximum eight-hr CO concentrations all are under the 10 mg/m^3 standard at the Havre St. and the Gove St. receptor locations. Under the

maximum congestion scenario at the Tunnel, however, the Revised PDP was estimated to result in a maximum eight-hr CO concentration of 10.7 mg/m^3 at Havre St. This is 0.7 mg/m^3 or 7% over the standard. This small exceedance is believed to be insignificant and to be within the uncertainty in the modeling input data and related modeling sensitivity. There is no eight-hr CO standard violation at the Gove St. receptor location under the maximum congestion scenario. The receptor located at the tennis court shows a slight increase in concentration from the Revised No-Build to the Proposed Development and Plan (FEIR), and the Revised PDP. The increase is approximately 6% and 4%, respectively, over the Revised No-Build concentrations. Again, this slight increase is believed to be within the modeling uncertainty.

REFERENCES

1. "Mobile Source Emission Factor for Low-Altitude Areas Only," Environmental Protection Agency, Office of Air and Waste Management, EPA-40019-78-006, March 1978.
2. L. L. Gothman, "Mobile I: Mobile Source Emissions Model," Environmental Protection Agency, Office of Transportation and Land Use Policy, Washington, DC, May 1978.
3. Massachusetts Port Authority, Boston, MA, Personal communication, 1980.
4. Personal communications, Vanasse/Hangen Engineering, Inc., Boston, MA, March-April 1981.
5. "Guidelines for Air Quality Maintenance and Analysis, Volume 9 (Revised): Evaluating Indirect Sources," Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, September 1978.
6. M. Platt, K. M. Chng, and R. D. Siegel, "Computer Program for the Air Quality Analysis of Airports," prepared for U.S. Environmental Protection Agency, by Northern Research and Engineering Corporation, Cambridge, MA, August 1971.
7. "Final EIR/EIS: Proposed Development of Bird Island Flats, Volume 2 - Appendix" prepared by Massachusetts Port Authority and the U.S. DOT/Federal Aviation Administration, Boston, MA, November 1980.
8. "Airport Vicinity Air Pollution Study" Prepared for the Federal Aviation Administration by the Argonne National Laboratory, Argonne, IL, December 1973.
9. "User's Guide for PAL. A Gaussian-Plume Algorithm for Point, Area, and Line Sources," Environmental Protection Agency, Environmental Sciences Research Laboratory, EPA-600/4-78-013, Research Triangle Park, NC, February, 1978.
10. "Carbon Monoxide Hot Spot Guidelines, Volume II: Rationale," U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, EPA-450/3-78-034, Research Triangle Park, NC, August 1978.

REFERENCES (Cont'd)

11. "Automobile Exhaust Emission Modal Analysis Model,"
U.S. Environmental Protection Agency Report No.
EPA-460/3-74-005, January 1974.
12. G. C. Holzworth, "Meteorological Potential for Urban Air
Pollution in the Contiguous United States," Paper No.
ME-20-C, presented at the Second International Clean Air
Congress, Washington, DC, 6-11 December 1970.

APPENDIX C-2 - Traffic Engineering memos
used in Air Quality Analysis

Vanasse/Hangen memo to N. Faramelli -
on hourly tunnel flows (February 23, 1981)
used in Appendix C-1 is included as
Appendix B-3 in this volume.

Variasse / Hangen Design Inc. **vhd**
Transportation Engineers & Planners
184 High Street, Boston, Massachusetts 02110
(617) 482-0749

Memo

LETTER

Date 3/5/81

Subject Buil Island Flats
81-105 A

To Mr Norman Farsmelli, Director
Planning
Massport

We are transmitting herewith peakhour and
8 hour volume for analysis links requested by
Scott Busch & Numan. Information is provided at
18 locations plus the Harbor Tunnel for:

- Existing Condition
- 1987 No Build
- 1987 High Intensity Lane
- 1987 Full Development

If you need additional information please call.

☐ Please reply ☐ No reply necessary

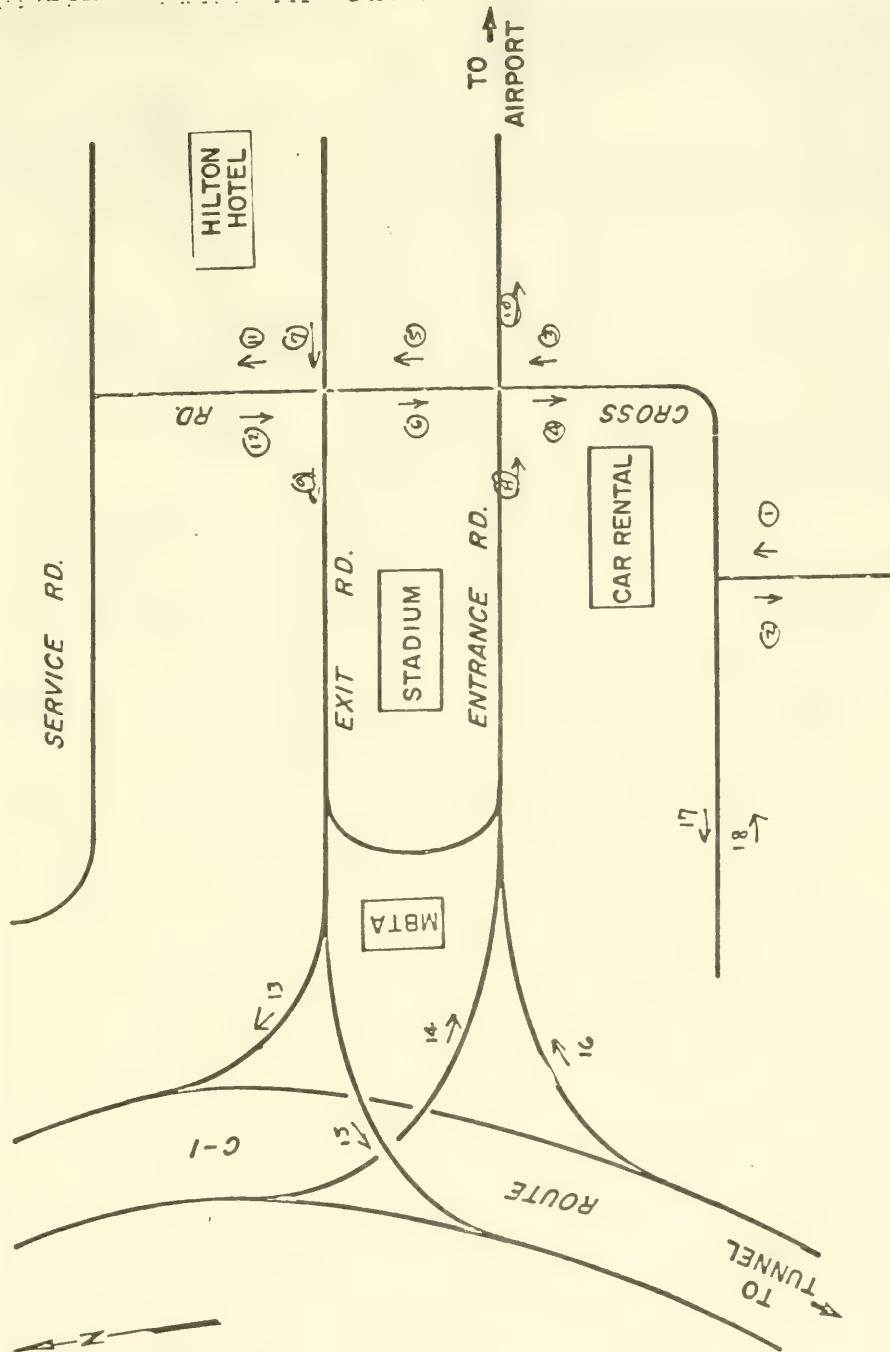
SIGNED

R. Hangen

STATION	EXUT		1987 NO 810		HI. INT CARGO ONLY		FULL DEVELOPMENT	
	PK HL	BHR	PK HL	BHR	PK HL	BHR	PK HL	BHR
1	155	1540	175	1730	223	2095	1219	5285
2	65	1540	75	1730	107	2030	390	3795
3	415	1980	465	2230	513	2595	1091	4085
4	495	2350	555	2650	587	2950	870	4715
5	430	3200	485	3200	533	4065	1026	5180
6	640	4275	720	4815	720	4815	793	5190
7	2000	11,590	2210	13,850	2250	13,050	2250	13,425
8	2090	13,510	2350	15,215	2382	15,510	2592	16,905
9	1885	11,540	2120	13,000	2168	13,365	2661	14,480
10	2200	13,710	2505	15,435	2505	15,435	2596	15,810
11	185	1935	210	2180	210	2180	210	2180
12	300	1820	340	2050	340	2050	407	2050
13	730	3745	820	4220	830 840	4365	1292	5510
14	670	3770	755	4245	768	4360	846	4895
15	1106	7415	1240	8380	1269	8570	1309	8,540
16	1365	9360	1535	10,540	1554	10,720	1686	11,580
17	265	2235	295	2520	295	2520	713	4,220
18	215	2235	245	2520	245	2520	245	2520

TUNNEL

IN BOUND TO BOSTON 810	2250	17,810	2534	20,060	2563	20,280	3020	21,950
OUTBOUND PK. 810	2695	19,215	3034	21,640	3053	21,820	3185	22,680
640								



To

Mr. Norm. Farnelli
Massport

Date

3/12/81

Subject

Brill Island Flats
EPA Data

We are transmitting herewith information requested by
Meng Ching of BBN in a memo dated 3/10/81.

Our analysis is based upon signal timing provided by
Stanley Siegel in a memo to Peter Eckenfeld dated 6/20/80
and turning movement data provided by Jack Bryant Associates.
We have not field verified either data source.

cc. Mr. Meng Ching BBN

☐ Please reply

☐ No reply necessary

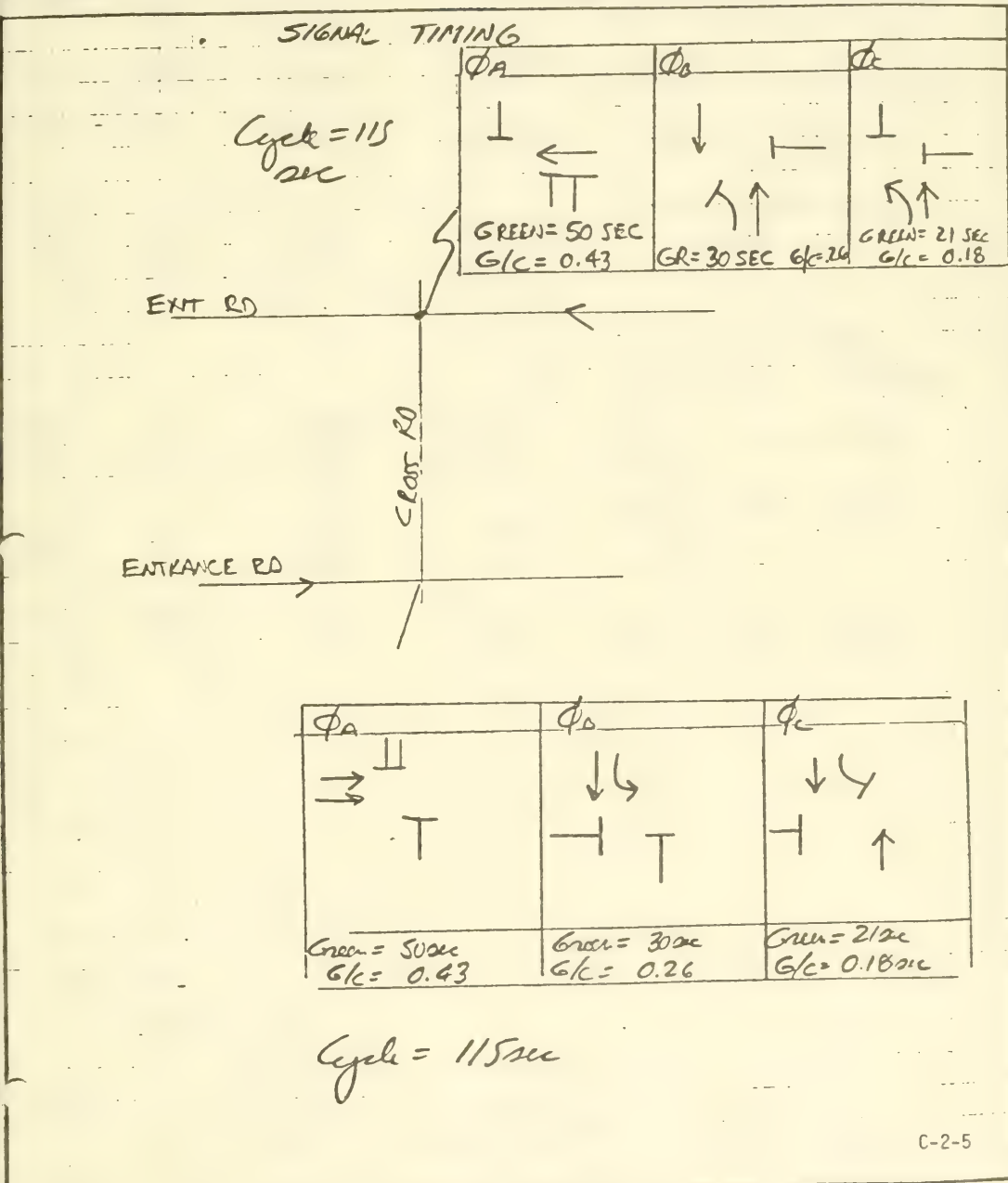
SIGNED

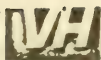
Rich Hangen



Vanasse / Hangen Engineering, Inc.
Consulting Engineers & Planners
184 High Street, Boston, Massachusetts 02110
(617) 482-1870

JOB BIF JOB No 80-105A
LOCATION LOGAN SHEET OF
CALCULATED BY RH DATE 3/11/81
CHECKED BY DATE
TITLE SIGNAL TIMING- EXISTING





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JOB ISLF JOB No. 00-1014
LOCATION LOGAN SHEET OF
CALCULATED BY RH DATE 3/11/81
CHECKED BY _____ DATE _____
TITLE APPROACH CAPACITIES / DEMAND

EXIT RD & CROSS RD		CAPY	DEMAND 1987 NO. 40	DEMAND 1987 CALCD ONLY	PM PEAK MAX 1987 FULL DEU.
EXIT RD	W. BOUND	1775 vph	2250	2250	2250
CROSS RD	S. BOUND	850 vph	340	340	407
CROSS RD	N. BOUND				
	THRU	1050 vph	165	165	165
	LT TURN	216 vph	320	368	861
ENTRANCE RD & CROSS RD					
ENTRANCE RD	E. BOUND	1812 vph	2090	2090	2090
	RT. LANE	516 vph	265	297	502
CROSS RD	S. BOUND				
	THRU	960	290	290	362
	LT TURN	312	430	430	430
CROSS RD	N. BOUND	387	465	513	1091



1111 NORTH (1)

WA = 36'

Fringe @ 1.1

Dist 6.5

3000 x 1.1 = 3300

PHF = 0.90

> 1.20

POP = > 1,000,000

LT = 10%

F = 1.00

T = 10%

F = 0.95

3300 x 1.20 x 1.0 x .95 = 3762

SV = 3762 x 0.43 = 1617 x 1.12 = 1812

(1T)

1111 NORTH (3)

WA = 21'

SV = 1700' x 1.1 = 1870

PHF = 0.90 x 1.20

1870 x 1.20 = 2244

LT = 0% T = 10% F = 0.95

RT = 40% F = 0.9

2244 x 0.9 x 0.95 = 1919

GK = 0.18

1919 x 0.18 = 345

x 1.12 = 387

WA = 12'



SV_E = 1200 x 0.43 =

(1R)

516

APPROACH (2)

(2T)



W = 20'

Fringe @ 1.1

SV = 1650 x 1.1 = 1815

PHF = 0.90

> 1.20

POP > 1,000,000

LT = 0 RT = 0 T = 5 F = 1.0

1815 x 1.20 x 1.0 = 2178

GK = 0.44:

SV = 2178 x 0.44 = 960

(2L)



WA = 10'

SV = 1200

C/C = 0.26

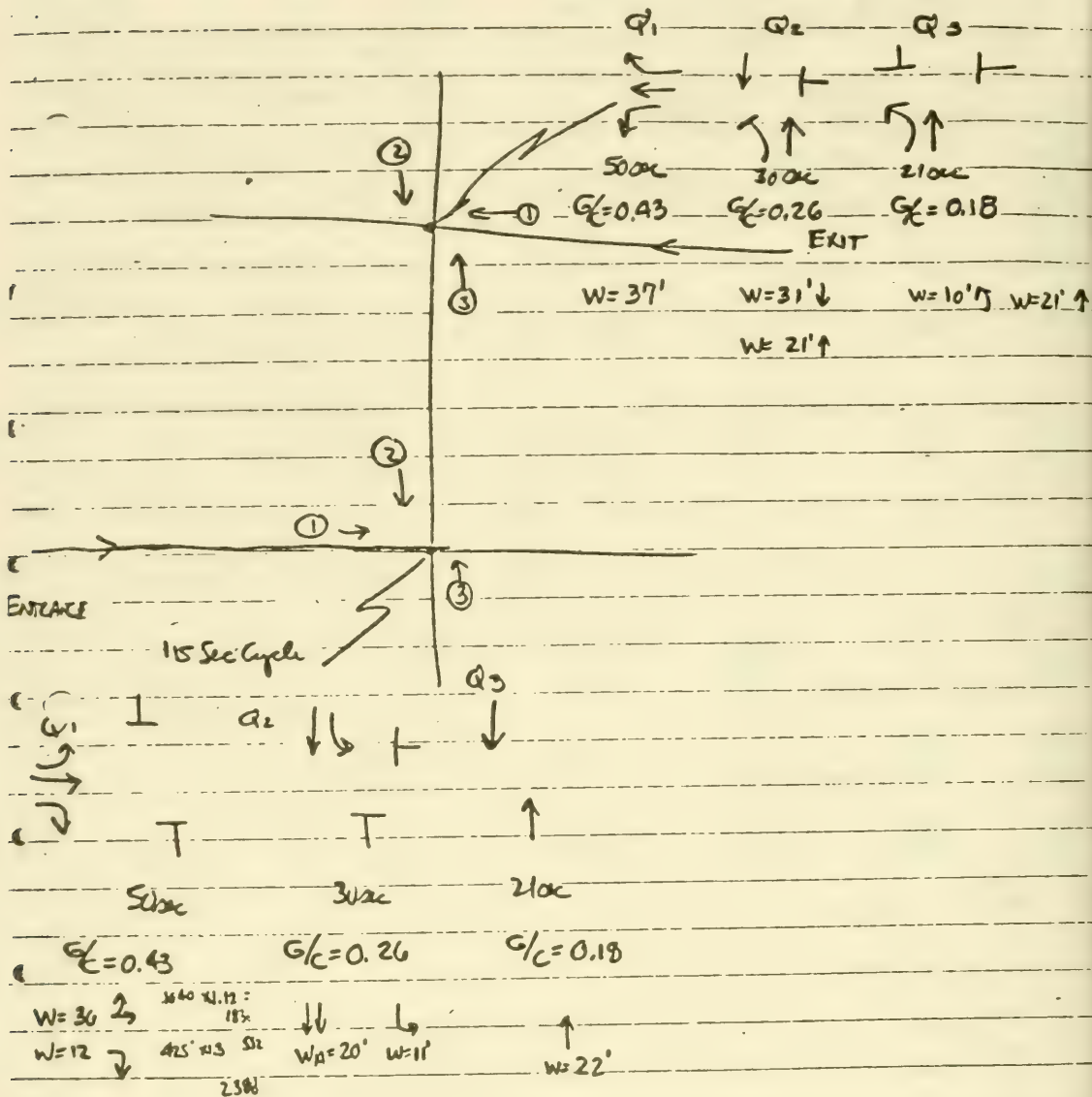
SV_E = 1200 x 0.26

= 312

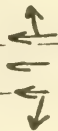
ENTRANCE RD & CROSS RD

RH 3/11/91

11.5 Sec Cycle



Approach (1)



$$W = 37'$$

$$3000 \text{ vphg}$$

ig @ 1.1

$$F @ 0.90 \quad P_p > 1,000,000 \quad F = 1.20$$

$$LT = 25\% \quad F = 0.98$$

$$RT = 2\% \quad F = 1.0$$

$$T = 6\% \quad F = 0.95$$

$$100 \times 1.1 \times 1.2 \times 0.98 \times 0.95 = 3687$$

$$G/C = 0.43$$

$$687 \times 0.43 = 1585 \times 1.12 = 1775$$

Approach (2)



$$W = 31'$$

$$2500 \text{ vphg}$$

$$LT = 0 \quad F = 1.0$$

$$RT = 50\% \quad F = 1.0$$

$$T = 10\% \quad 0.95$$

$$2500 \times 1.1 \times 1.12 \times 0.95 = 2926$$

$$G/C = 0.26$$

$$2926 \times 0.26 = 761 \times 1.12 = \underline{\underline{850}}$$

Approach (3)

(3T)



$$W = 21$$

$$SV = 1700 \times 1.1 \times 1.2 = 2244$$

$$R = 0 \quad L = 0 \quad T = 10 \quad F = 0.9$$

$$G/C = 0.44$$

$$2244 \times 0.44 \times 0.95 = 938$$

$$938 \times 1.12 = \underline{\underline{1050}}$$

(3L)



$$10'$$

$$SV = 1200$$

$$G/C = 0.18 = \underline{\underline{216}}$$

EXIT RD & CROSS RD

RH 3/11/81

C-2-9



Vanasse / Hangen Associates, Inc.
Transportation Engineers & Planners
184 High Street, Boston, Massachusetts 02110
617/462-2749

March 17, 1981

Ref: VHA #80-105

Mr. Norm Farinelli
Director of Planning
MASSPORT
99 High Street
Boston, MA 02110

Dear Norm:

Enclosed you will find the queue length calculations for Existing, 1987 No Build and 1987 Build conditions, based on the data observed in the field on March 12, 1981.

Page 6 of the calculations summarizes the PM peak hour impact of the BIF Development. As can be seen, the average number of queued vehicles at the toll plaza nearly doubles over existing conditions. It should be pointed out, however, that the analysis is very sensitive to the distribution of approaching traffic using the various toll booths. We have assumed existing trends will continue. To the extent this changes, the analysis results will change.


Page 7 shows a plot of hourly volume approaching the tunnel and total vehicles queued at the plaza. In using this chart, it is necessary to be aware of the assumptions made in developing it. These include:

- Volume distribution among toll booths
- All toll booths open
- Capacity of the exact change booths = 600 vph
- Capacity of the manual booths = 500 vph
- Random arrivals/service times

If you have any questions or need additional data, please call.

Very truly yours,

VANASSE/HANGEN ASSOCIATES, INC.


William J. Roache, P.E.

WJR:mg

Enc.

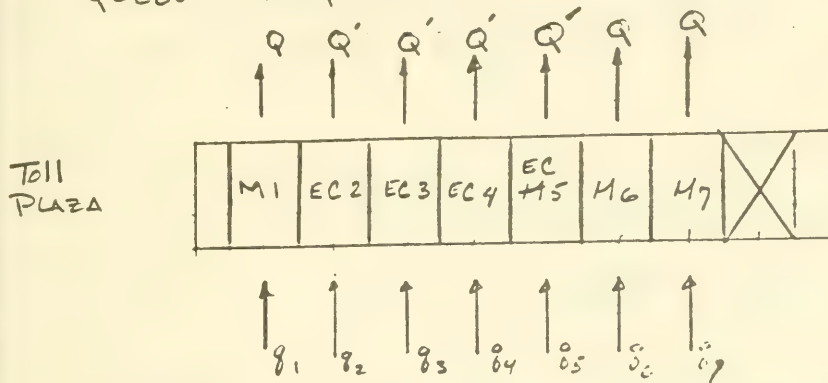
C-2-10



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 1 High Street, Boston, Massachusetts 02110
 1482-1870

JOB BIRD ISLAND FLATS JOB No. EO-105
 LOCATION EAST BOSTON SHEET 1 OF 7
 CALCULATED BY: WJR DATE 17 MAR 81
 CHECKED BY: _____ DATE _____
 TITLE TOLL BOOTH QUEUE LENGTHS

- 1) ASSUME RANDOM ARRIVALS
- 2) NEG. EXPONENTIAL SERVICE TIMES
- 3) SEPARATE FLOWS FOR SINGLE CHANNEL QUEUE DISCIPLINE.



VARIABLES

q_{1-7} = AVG. ARRIVAL RATE IN VEH'S/SEC/BOOTH

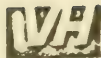
Q = AVG. SERVICE RATE IN VEH'S/SEC
 FOR A MANUAL TOLL BOOTH

Q' = AVG. SERVICE RATE IN VEH'S/SEC
 FOR AN EXACT CHANGE BOOTH.

ESTIMATION OF $Q + Q'$

FIELD OBSERVATIONS OVER A TWO HR PERIOD
 INDICATE AVG SERVICE TIMES PER VEH. OF

7.07 SEC FOR MANUAL BOOTHS AND
 5.92 SEC FOR EXACT CHANGE BOOTHS



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JOB BIRD ISLAND PLATE JOB No 80-105
LOCATION EAST BOSTON SHEET 2 OF 2
CALCULATED BY WTR DATE 17 MAR 81
CHECKED BY _____ DATE _____
TITLE _____

CONSEQUENTLY THE CAPACITY OF EACH TYPE
OF BOOTH IS AS FOLLOWS

$$\text{MANUAL} \rightarrow 3600 / 7.07 = 509 \text{ SAY } 500 \text{ VPH}$$

$$\text{EXACT CHANGE} \rightarrow 3600 / 5.92 = 608 \text{ SAY } 600 \text{ VPH}$$

THERE FOR

$$Q = 500 / 3600 = .139$$

$$Q' = 600 / 3600 = .167$$

CALCULATE $g_1 - g_7$

FOR 4-5 PM COUNTS
FROM MTA

$$g_1 = 249 / 3600 = .069$$

$$g_2 = 432 / 3600 = .120$$

$$g_3 = 364 / 3600 = .101$$

$$g_4 = 253 / 3600 = .070$$

$$g_5 = 375 / 3600 = .104$$

$$g_6 = 261 / 3600 = .073$$

$$g_7 = 309 / 3600 = .085$$



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JOB BIRD ISLAND PIKE JOB NO. PO-115
 LOCATION EAST BRIDGE SHEET 3 OF 3
 CALCULATED BY WTR DATE 17 MAR 81
 CHECKED BY _____ DATE _____
 TITLE _____

• CALCULATE AVG. QUEUE LENGTH ASSUMING M/M/1
QUEUE DISCIPLINE

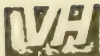
- USE FOLLOWING EQUATION TO GET AVG QUEUE

$$E(n) = \frac{\lambda}{\mu - \lambda}$$

					ADJ
Booth 1	avg Queue	= 1.00 VEH	→ SAY	1.00	2.17
Booth 2	" "	= 2.57 VEH	→ SAY	3.00	3.21
Booth 3	" "	= 1.54 VEH	→ SAY	2.00	1.93
Booth 4	" "	= .729 VEH	→ SAY	1.00	.91
Booth 5	" "	= 2.00 ^{1.66} VEH	→ SAY	3.00 ^{2.00}	2.07
Booth 6	" "	= .769 VEH	→ SAY	1.00	1.07
Booth 7	" "	= 1.60 VEH	→ SAY	2.00	3.47

• COMPARE AVG. QUEUES TO OBSERVED AVG S.

BOOTH	CALCULATED QUEUE	OBSERVED QUEUE	DIFFERENCE CALC - OBS	%
1	1.00	3.91	- 2.91	75
2	2.57	3.16	- .59	20
3	1.54	1.90	- .36	20
4	.73	1.41	- .68	48
5	1.66	1.08	+ .58	53
6	.77	1.5	- .73	48
7	1.60	2.58	.98	38



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JOB BIRD ISLAND FLATS JOB NO. 80-1-5
LOCATION EAST BEACH SHEET 4 OF 4
CALCULATED BY WTR DATE 17 MAR 81
CHECKED BY _____ DATE _____
TITLE _____

CONCLUSION: • IN GENERAL CALCULATIONS TEND TO UNDERSTATE QUEUE LENGTHS BY 20 TO 75 PERCENT.

• CUMULATIVE ERROR FOR EXACT CHANGE BOOTHS AVG'D 10%

• CUMULATIVE ERROR FOR MANUAL BOOTHS AVG'D 54%

CONSEQUENTLY THESE ADJUSTMENTS SHOULD BE MADE TO CALCULATED QUEUES UNDER FUTURE CONDITIONS.

FUTURE COND. QUEUE LENGTH CALCULATIONS
→ PM PEAK HOUR 1987 NO BUILD

TOTAL TUNNEL FLOW = 2540 VPH 4-5 PM

By TOLL BOOTH

	1	2	3	4	5	6	7
VOLUME	279	483	406	279	432	305	356
QUEUE LENGTH	1.26	4.12	2.09	.87	2.57	1.56	2.47
ADJUSTED QUEUE LENGTH	2.8	5.15	2.6	1.08	3.21	3.39	5.39

TOTAL VEH. QUEUED = 23.57 SAY 24



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JOB BIRD ISLAND PLANTS JOB No. FO-100
LOCATION EAST BOSTON SHEET 5 OF 7
CALCULATED BY WTR DATE 17 MAR 81
CHECKED BY _____ DATE _____
TITLE _____

FUTURE COND. ANALYSIS

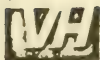
PM PEAK HOUR 1987 BUILD

TOTAL TUNNEL VOLUME = 2857 VPH

BOOTH

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
<u>VOLUME</u>	<u>314</u>	<u>543</u>	<u>457</u>	<u>314</u>	<u>486</u>	<u>343</u>	<u>400</u>
<u>QUEUE LENGTH</u>	<u>1.71</u>	<u>9.53</u>	<u>3.19</u>	<u>1.10</u>	<u>4.26</u>	<u>2.18</u>	<u>4.00</u>
<u>ADJUSTED</u>	<u>3.71</u>	<u>11.9</u>	<u>3.98</u>	<u>1.38</u>	<u>5.33</u>	<u>4.74</u>	<u>8.69</u>
<u>QUEUE LENGTH</u>							

TOTAL VEH. QUEUED = 39.73



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JOB PIRD ISLAND FATS JOB No 20-105
LOCATION EAST FERRY SHEET 6 OF 7
CALCULATED BY WTR DATE 12 MAR 81
CHECKED BY _____ DATE _____
TITLE _____

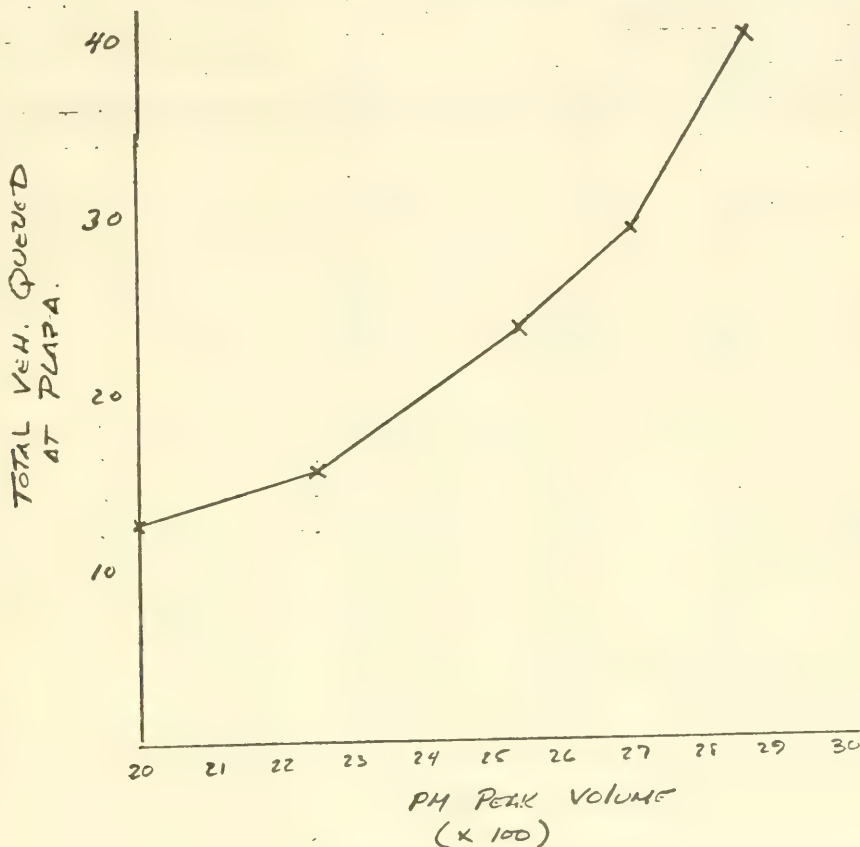
SUMMARY OF PM PEAK QUEUING

CONDITION ELEMENT	EXISTING	EXISTING	1987	1987
	OBSERVED	CALC'D	NO BUILD	BUILD
VOLUME	2240	2250	2540	2860
TOTAL AVG. VEH. QUEUED	15.62	15.93	23.57	39.73



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JOB BIRD ISLAND FLAT JOB No 80-1005
LOCATION EAST BOSTON SHEET 7 OF 7
CALCULATED BY WJTR DATE 17 MAR 81
CHECKED BY _____ DATE _____
TITLE _____



Hangen Design Inc. **vhd**
rtation Engineers & Planners
n Street, Boston, Massachusetts 02110
82-0749

Memo

LETTER

Date 4/15/81

Subject EG-105/A

To

Alt Farnum & Norman, Inc
50 Moulton St
Cambridge, Ma 02138
Attn: Mary Anna Thorpe

We are enclosing herewith

- 1) Proposed Signal Timing @ Airport Roadway
- 2) Approach Capabilities
- 3) Link Hour to E Hour Factors

cc Norm Farnum, President
90 High St

☐ Please reply

☐ No reply necessary

SIGNED

E. Hangen

C-2-18

Masse / Hangen Engineering, Inc.
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 482-1870

JOB BIF JOB No. 80-105A
 LOCATION LOGAN SHEET OF
 CALCULATED BY RH DATE 3/11/81
 CHECKED BY RH DATE REV 4/15/81
 TITLE APPROACH CAPACITIES / DEMAND

EXIT RD & CROSS RD	CAPY	DEMANDS PM PEAK HAX		
		1987 NO. LK	1987 CALCD ONLY	1987 FULL DEV.
EXIT RD W. BOUND	2612 1445 vph	2250	2250	2250
CROSS RD S. BOUND	328 850 vph	340	340	407
CROSS RD N. BOUND	158			
THRU	1050 vph	165	165	165
LT TURN	216 vph	320	368	861
	200			
ENTRANCE RD & CROSS RD				
ENTRANCE RD E. BOUND	2107 1612 vph	2090	2090	2090
RT. LANE	516 vph	265	297	502
CROSS RD S. BOUND	60			
THRU	860 vph	290	290	362
LT TURN	312 vph	430	430	430
	50			
CROSS RD N. BOUND	387	465	513	1091

1967 Fall
Revised

JOB BIE JOB No. 80-105A
 LOCATION LOGAN SHEET OF
 CALCULATED BY RH DATE 3/11/81
 CHECKED BY: DATE RA 4/11/81
 TITLE SIGNAL TIMING- EXISTING

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SIGNAL TIMING

PROPOSED

Cycle = 115
sec

EXIT RD

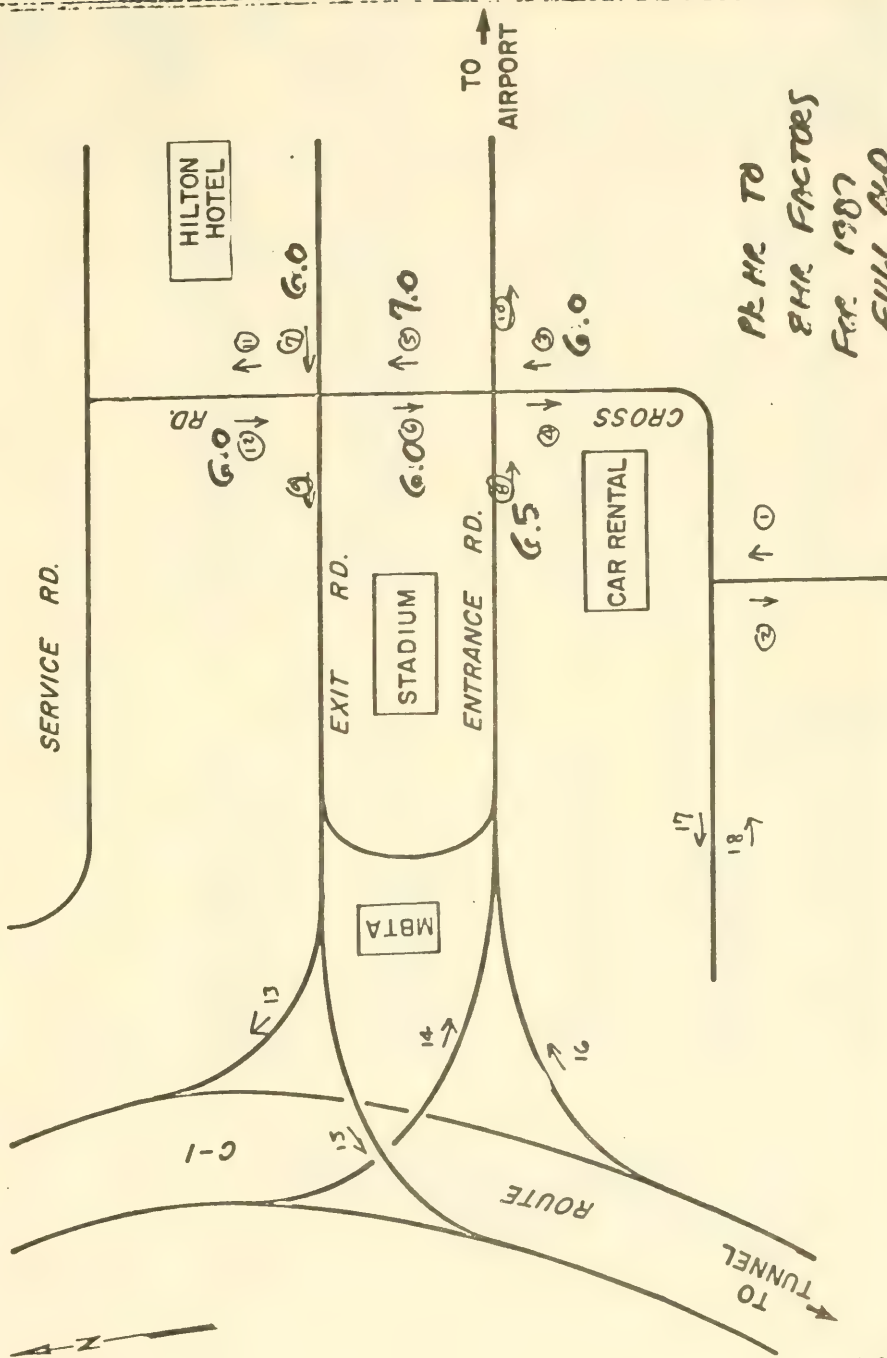
CLASH RD

ENTRANCE RD

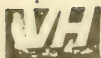
ϕ_A	ϕ_B	ϕ_C
GREEN 50 SEC G/C = 0.43 $C/L = 0.62$ $C = 115$	GREEN 30 SEC G/C = 0.26 $C/L = 0.10$ $C = 12$	GREEN 24 SEC G/C = 0.16 $C/L = 0.15$ $C = 17$

ϕ_A	ϕ_B	ϕ_C
GREEN 50 SEC G/C = 0.43 $C/L = 0.50$ $C = 58$	GREEN 30 SEC G/C = 0.26 $C/L = 0.10$ $C = 12$	GREEN 24 SEC G/C = 0.16 $C/L = 0.22$ $C = 31$

Cycle = 115 sec



PE HR TO
 EHR FACTORS
 FOR 1987
 FULL RD
 PM 4/15/81



Vanasse / Hangen Engineering, Inc.

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617 / 482-1870

JOB 81-035 JOB No. _____
LOCATION BIF COBAN SHEET _____ OF _____
CALCULATED BY RH DATE 4/26/91
CHECKED BY _____ DATE _____
TITLE _____

TUNNEL TO CCO	EXIST	1987 NO BUILD	1987 FEIR FULL BLD	1987 RFEIR IN TECH
12-1	2041	2250	2510	2480
1-2	1910	2110	2250	2220
2-3	2360	2600	2720	2680
3-4	2541	3160	3340	3260
4-5	2241	2590	3000	2860
5-6	2255	2580	2890	2810
6-7	2347	2760	2860	2820
7-8	2117	2910	2970	2930

TUNNEL FROM CCO				
12-1	2266	2500	2770	2690
1-2	2180	2400	2640	2570
2-3	2344	2520	2770	2720
3-4	2643	2920	3020	2990
4-5	2695	2970	3100	3050
5-6	2605	2870	2950	2930
6-7	2270	2500	2580	2560
7-8	2209	2440	2450	2450

These Numbers are to be used for
air quality analysis.





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